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HACKER HEAVEN: PROGRAMS FOR ADAM, APPLE, ATARI, COMMODORE 64 AND VIC-20, IBM, TI, TIMEX, AND TRS-80.

PINBALL BOUNCES BACK

HACKERS IN HISTORY

FREE POSTER INSIDE

K POWER™

THE MAGAZINE FOR THE COMPUTER GENERATION

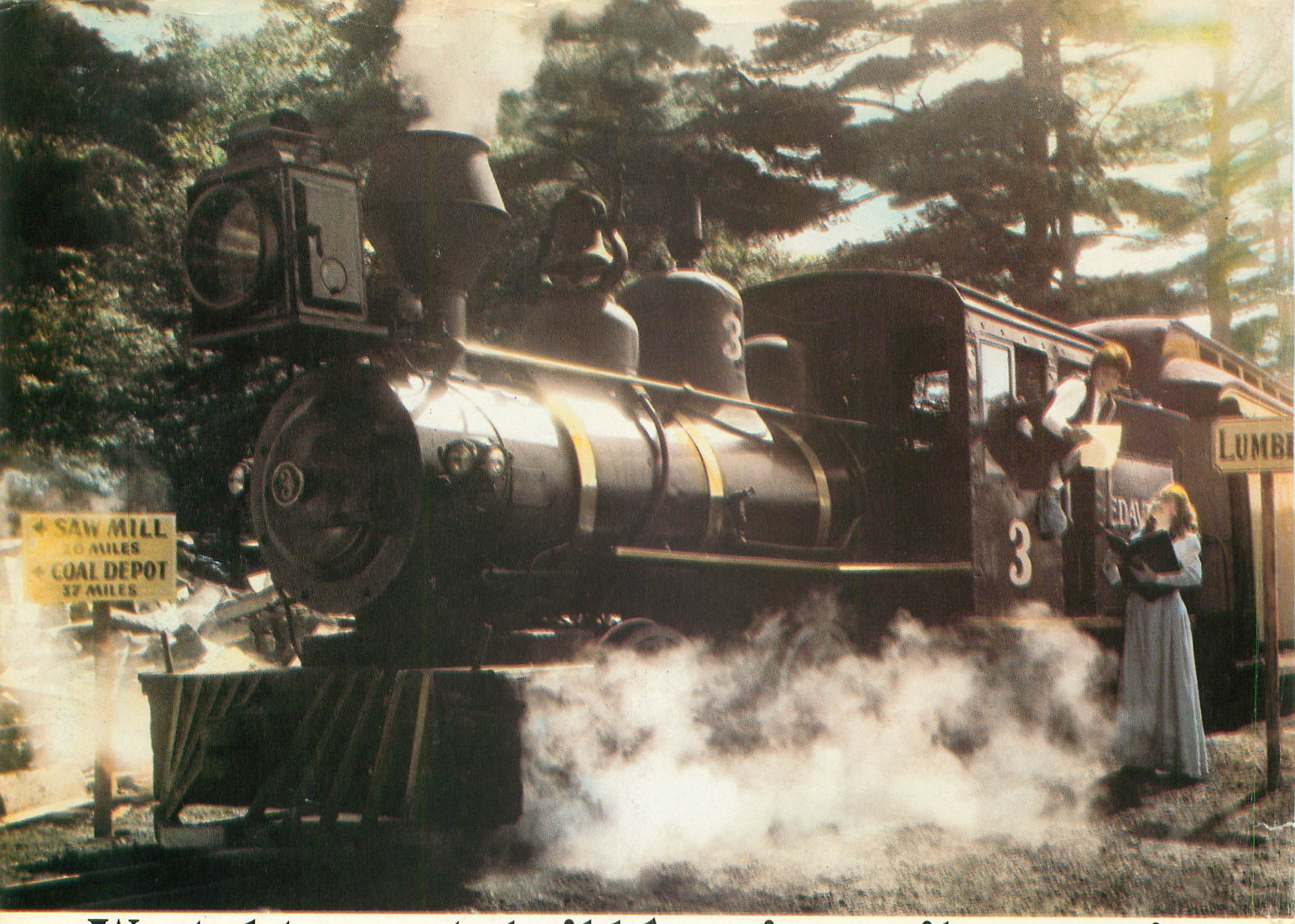
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Program Along with Joey Ramone



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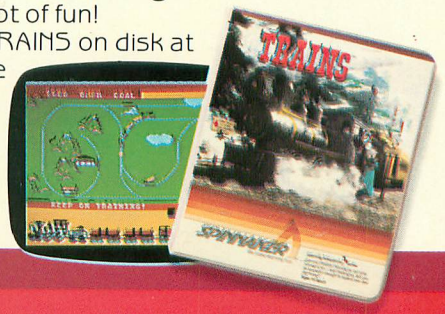
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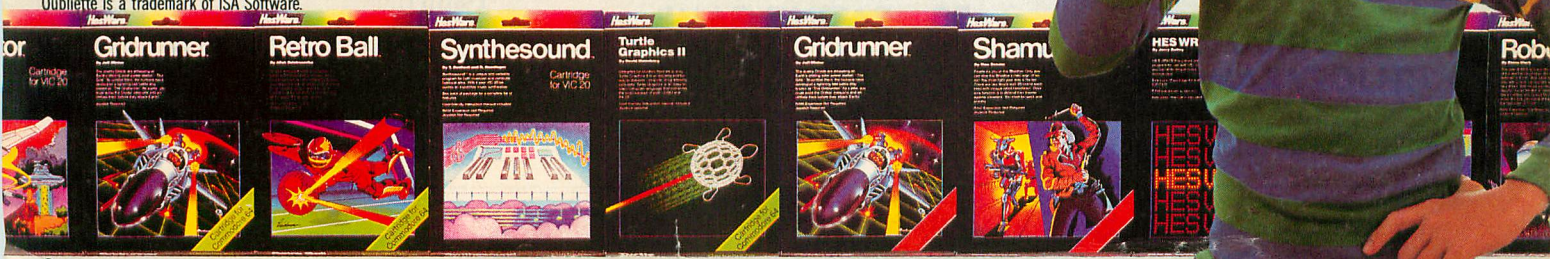
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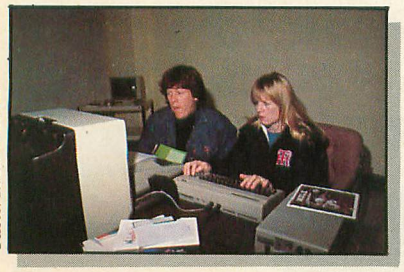
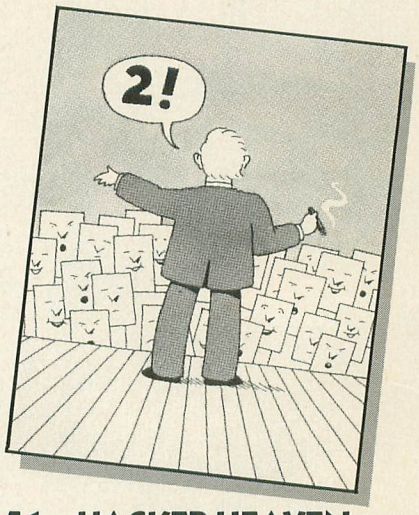


Photo: Robert Minkin

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Cover photos: David Godlis (Joey Ramone), Rick Browne (Will Harvey), Deborah Feingold (Talking Heads)



The arcade classics. Now playing on home computers everywhere.

If you own a Commodore VIC 20 or 64, a Texas Instruments 99/4A, an IBM or Apple II, we've got what you've been waiting for!

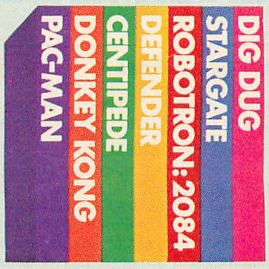
The biggest arcade hits ever, the classics. DONKEY KONG by Nintendo, CENTIPEDE,™ PAC-MAN, DEFENDER, ROBOTRON: 2084, STARGATE and DIG DUG. (On the TI 99/4A you can also play Protector II, Shamus, Picnic Paranoia and Super Storm.)

And the hits will keep on coming. Soon you'll be able to play JOUST,™ JUNGLE HUNT,™ MOON PATROL,™ POLE POSITION,™ MS. PAC-MAN™ plus others on your home computer. Some games also available on Colecovision and Intellivision.

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EDITOR'S NOTE

My Comedy Debut

I don't like to make big claims, but I'm the world's worst joke teller. I'm lousy at thinking of jokes in the first place. I never remember punch lines. But it's my delivery that really stinks. Other people tell me it's actually painful to listen to me tell a joke.

Assistant Editor Michael Tuomey and Resident Hacker Matt Davis took pity on me. They deny it, but I'm sure they designed this month's program—*Your Comedy Debut*—just for me. I can type this program (you can, too) into any computer and then try my hand at joke telling. (The object is to get the residents at the Old Comedians' Home to emit a chuckle or two by telling old jokes.) The great thing is, I can do this in the privacy of my own office, where no one else will know when my jokes are received with a snore or a boo. This way I'm out of Michael's and Matt's hair. They don't have to suffer through my horrible jokes, like: "Did you hear the one about two peanuts walking down the street? (Punch line coming!) One was a salted!"

K-POWER has lots of other programs this month, too. Another favorite of mine is the Joey Ramone "Slug" program—as far as I know, it's the first rock song ever translated to computers! Our technical editor, John J., even brought in his guitar to sing along with the computer! Let me know what you think of K-POWER's programs. And send in your own—John J. and Technical Director Lance Paavola are dying to see some new programs.

We also need your input in other ways. Let Michael Tuomey know if you want to review software or have a software-related story idea. Write Associate Editor John Holmstrom if you've got a great Scrolling in Dough story, a hot news item, or a humor idea. Write Dr. Kursor for answers to your technical and programming questions. And write me about anything. I want to know what else you'd like K-POWER to tackle in the future.



Photo: Roberta Bayley

Joey Ramone in the K-POWER offices.

Anne Krueger

Anne Krueger
Editor

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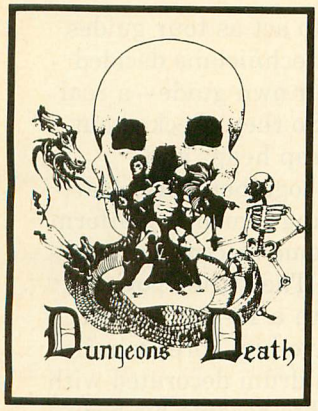
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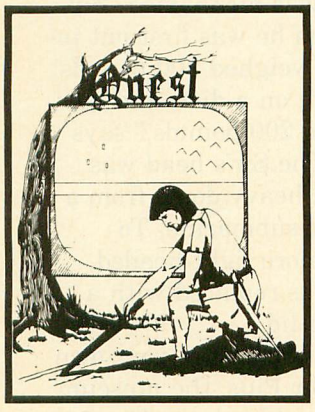
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QUEST - A different kind of Graphic Adventure, it is played on a computer generated mape of Alesia. You'll have to build an army and feed them through combat, bargaining, exploration of ruins and temples, and outright banditry! Takes 2 - 5 hours to play and is different each time.

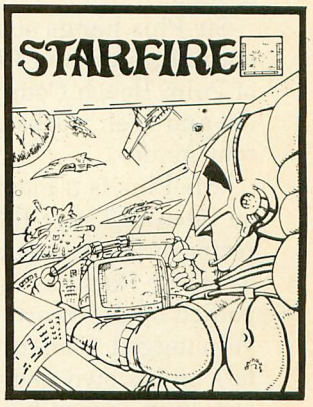
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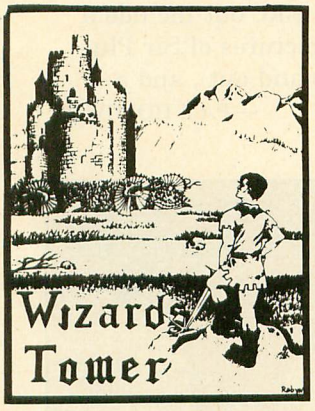
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STARFIRE - If you enjoyed StarRaiders or StarWars, you will love Starfire. It is not a copy, but the best shoot-em-up, see them in the window space game on the CMD64 or TRS80C. The fantastic graphics will put you right in the control room as you hyperspace from quadrant to quadrant fighting the aliens and protecting your bases.

Available On: TRS80C 16K, CMD64

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WIZARDS TOWER - A fantasy game played on a map of forests and dungeons - with dragons and wizards to kill. Similar to QUEST and fun for adults, but a little simpler and playable for the younger set (8 - 60).

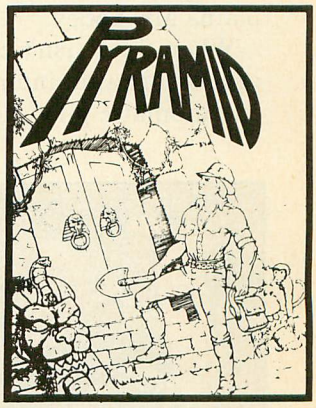
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COMPUZINE

VOLUME 1 NUMBER 2

Edited by John Holmstrom

Sir Plus, The Trashy Robot

He's got a tennis ball for a nose. His mouth is a series of light-emitting diodes. His head is a plastic garbage can lid. His fans number in the thousands. Who is he? Sir Plus, the robot made from leftovers, surplus parts, and anything else lying around.

Sir Plus hangs out at the Science Museum and Planetarium of Palm Beach County in Florida, and even works there as a tour guide.

"Sir Plus is a moving exhibit on robotics," says Ed Sobey, director of the museum. "On most days, Sir Plus has to be accompanied by an escort, so he won't get mugged. Sometimes, though, he's on his own and is very good at taking care of himself," explains Mr. Sobey.

When Sir P. isn't zipping around his aluminum-foil track on automatic pilot, he's operated by remote control. When he's on remote, it gives visitors a chance to ask Sir Plus questions about the exhibits. If any little brats try to hitch a ride on his bumpers, he dismisses them with a terse "Buzz off, kid!"



Photo: Ed Sobey

Here he is—Sir Plus—the robot made from junk!

Sir Plus was born when the museum couldn't find enough volunteers to act as tour guides. A bunch of technicians decided to build their own guide—a real cheap one. So they checked out the local scrap heaps and slapped Sir together. They started by building a mobile platform and hung some electronic components on it. Then, they powered Sir Plus with a 12-volt car battery and gave him three wheels. A 55-gallon drum decorated with flashing lights became his body.

Sir Plus was nicknamed "Sir Blimp" when he was first put together—he weighed 300 pounds! "We put him on a diet, and now he's down to 200 pounds," says Ed Sobey. The Sir's head was originally a heavy dome from a Tiger Shark submarine. To make him more light-headed, the dome was replaced with a garbage can lid.

If you want to make your own version of Sir Plus, the museum will send you his plans. They cost a hefty $50, but include a schematic, pictures of Sir Plus (both inside and out), and a parts list. —PAM HOROWITZ

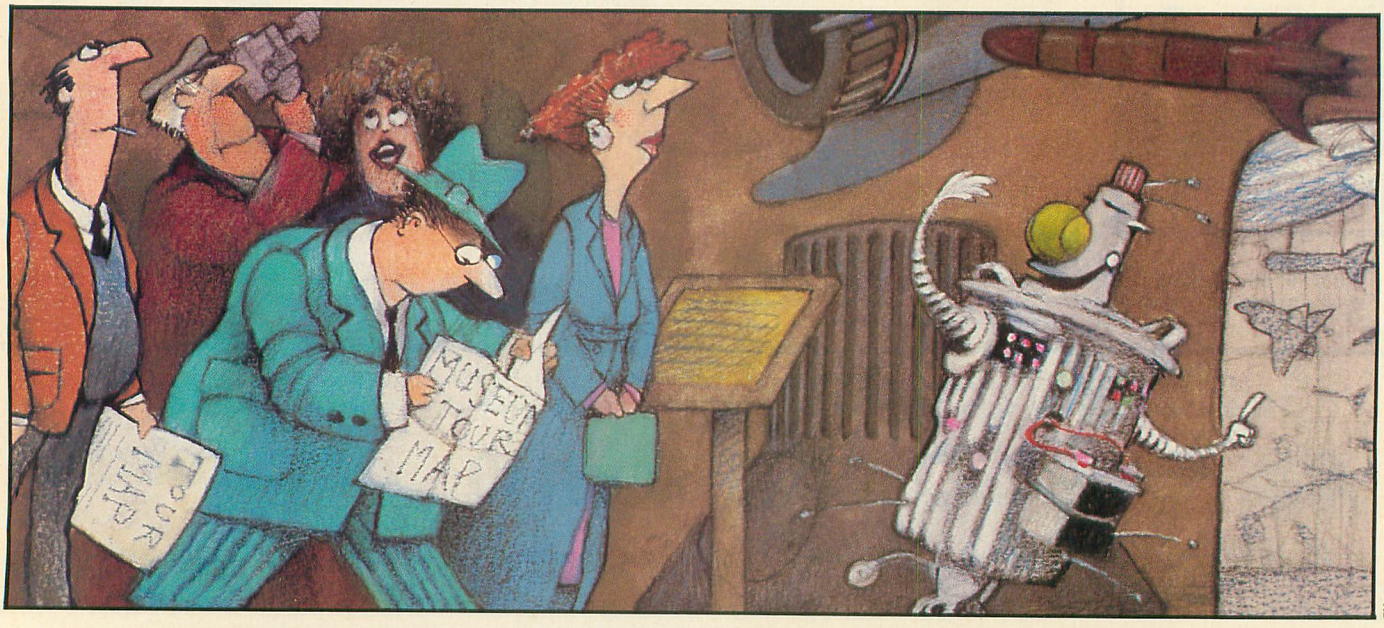


Illustration: Howard B. Lewis

ARCADE CLASSICS.
A BLAST-FROM-THE-PAST.









Remember those great arcade games of the past?

Games like Bally Midway's™ Seawolf II.™ As sub commander, you torpedo enemy ships moving at different speeds. Sink as many as you can, but watch out for the mine fields.

And Bally Midway's Gun Fight.™ In the most famous shootout of all time, you'd better be a straight shooter and fast on the draw.

Exidy's™ Starfire™ gives you outerspace graphics that are out of this world. Plus a starship with laser cannons to help you rid yourself of alien forces.

And there's Exidy's Fire One!™ Hone in on the enemy with sonar. Then it's up periscope and torpedoes away.

EPYX has brought the arcade classics home—at the right price for you. We've combined the Bally Midway classics Seawolf II and Gun Fight on one disk and Exidy's classics Starfire and Fire One on another. So get the arcade classics today and have a blast-from-the-past on us.

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Small-town weatherman makes it big

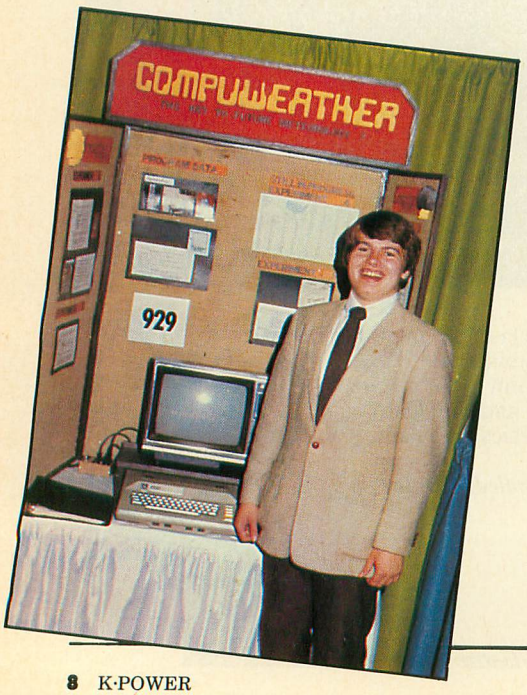
It's breezy and clear for 18-year-old Lee Smith. His weather-forecasting program has turned him into a money-making meteorologist.

By Lee Smith

It all started in the eighth grade, when I was 13 years old. I had to take earth science, and had a hard time with it. My grades were so low, I was almost afraid I'd flunk out! Then, I had to come up with some kind of science project. I picked weather forecasting. The project got me an "A". I entered it in a science fair, and it won a prize. I just kept it up and got into it more every year.

See, Williamstown, West Virginia, my hometown, is a small community. It has a common problem with other small U.S. cities—its weather forecasts come from larger cities up to 150 miles away. This means the weather forecasts aren't always dependable. To counter this problem, I developed a weather-forecasting system using an Atari 800 home computer. The system is 96 percent accurate, compared with the 75-percent accuracy (in this region) of the National Weather Service. I call it *GRASP* (Graphics Related Atmospheric Synopsis Program).

The *GRASP* program uses many of the same theories that the National Weather Service uses, such as basic frontal movement and the jet stream. It also includes my own "Checkpoint City Theory." By using it, the computer can use two surrounding cities to determine the potency of an oncoming weather system. It uses two other cities (as well as local conditions) to predict the effects it will have on the forecast area. I collect all my data from an NOAA weather radio (a 24-hour high-band radio network that provides continuous radio reports) and a home barometer. The result—a complete forecast with predictions for cloudiness, chance of precipitation, and temperatures up to 36 hours in advance.



The advantage of using a computer is that it takes something complicated, like weather forecasting, and makes it easy. *GRASP* becomes an almost completely automated system with the addition of a modem, a subscription to a major telecommunications network, and the new AtariLab temperature and light sensors.

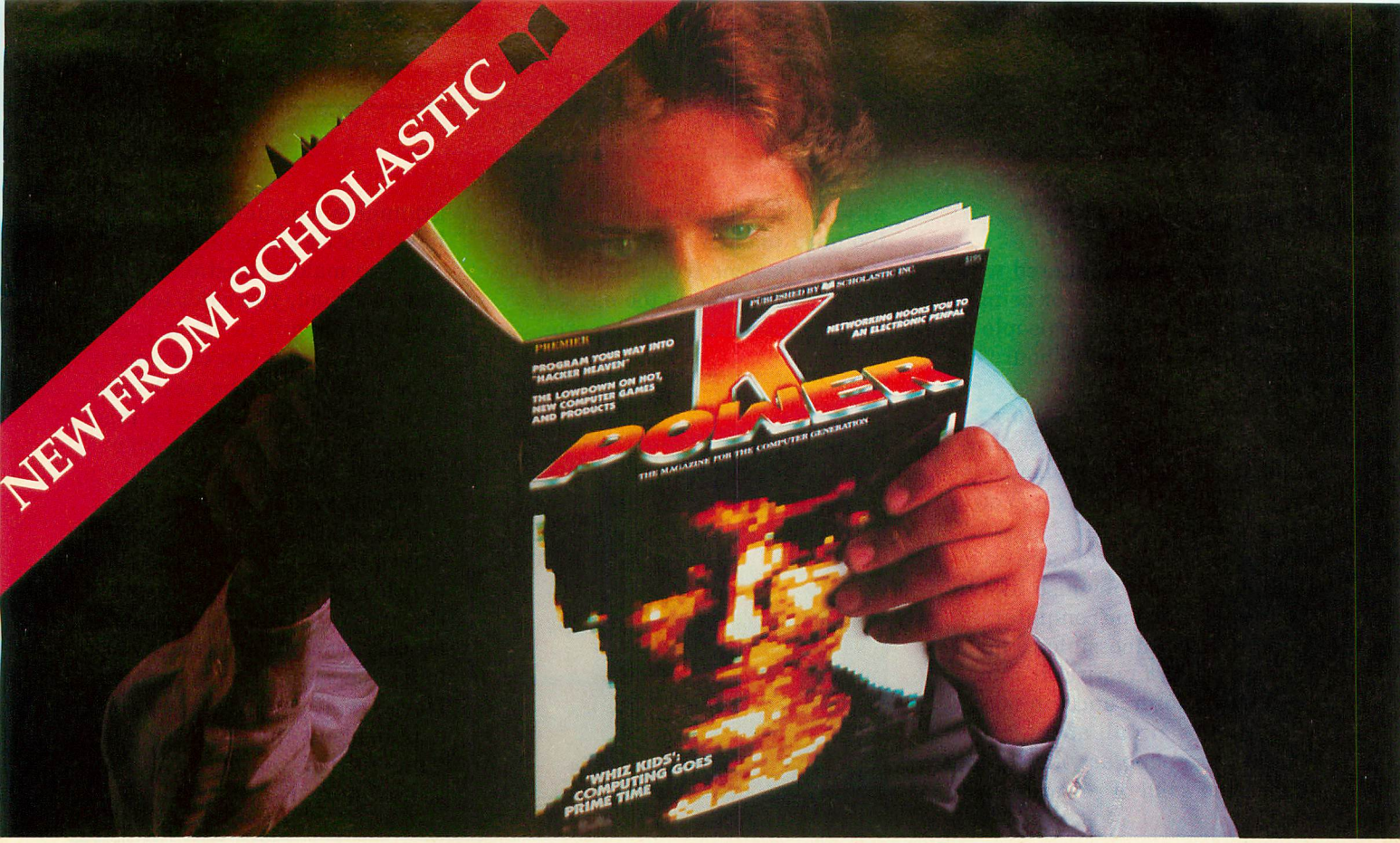
GRASP isn't available for public purchase (yet!), but it does help me immensely when I prepare my three live weather reports for WMOA radio (a CBS affiliate in nearby Marietta, Ohio), as well as my daily weather column in the *Marietta Times*. I call in three times a day (before school begins, during lunch, and after school).

Between my newspaper column and the radio work, I clear between $500 and $1,000 a month. I reinvest most of my money in new computer equipment (I've just saved up for a complete system). I'm not sure what I'd like to be doing in 10 years. I know I'd like to get into communications, meteorology, and/or computer science. Being a professional weatherman isn't out of the question.

Some programmers write stuff for software companies and hope to get lucky by making a game that will sweep the nation. I think the best way to make money is to find a need and fill it. Although it took me six years to develop my weather-forecasting abilities (five years to study meteorology and one to write the program), it's paying off in the end.

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Why Do We Play?

Have you ever wondered why you like to play video or computer games? What keeps people glued to the screen for hours on end?

When you gobble a dot or munch a monster, you get instant feedback. The response is very quick and very safe. You know it's not for real.

Most people like to take on challenges, but they also like to win. So, a video or computer game that is impossible to master won't be a favorite. It's no fun to be a loser, and fun is what games are all about.

All of the popular video games offer some kind of reward—usually in the form of points. If it's too hard to earn those points, beginners become frustrated and quit. If the game is too easy, players lose interest. The programmers who design the games have to strike a balance.

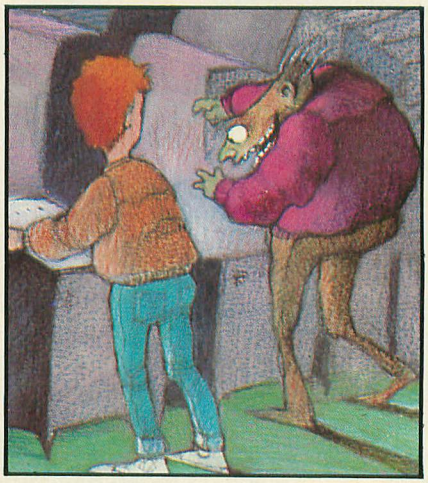


Illustration: Howard B. Lewis

If you make a mistake on a test in school, you can't correct it once you turn it in. Your grade is recorded, and you can only hope to do better the next time. Video games let you make mistakes and correct them—over and over again.

People who enjoy zapping aliens or blowing away robots don't necessarily have killer tendencies. More than likely, they're simply taking part in a fantasy world that gives them lots of opportunities to succeed. However, if you ever have any doubts about the guy playing the game next to you, don't hesitate to get outta-there! —P.H.

Computerized 45

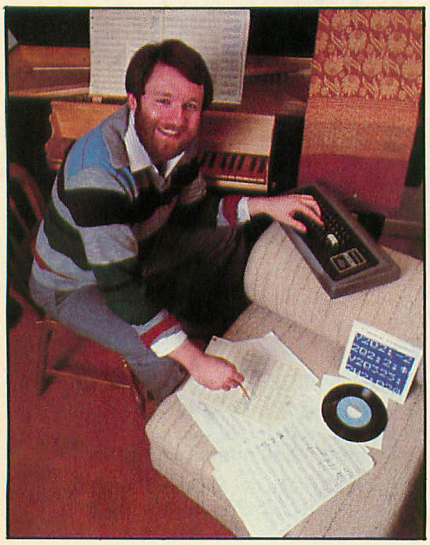


Photo: Martha Leonard/Picture Group

If you've always wished you could make music, but you can't play an instrument, a computer may be the answer.

It was for Robb Murray, who wanted to write music when he was in high school. The tunes were in his head, but he couldn't play them because he wasn't skilled on any instrument. It wasn't until Robb turned to the computer keyboard that he could enjoy the thrill of composing.

First, he tried a computer that belonged to a friend. He was so excited by it that he didn't just play music and compose original melodies, he made a record.

Robb recorded a 45 r.p.m., full of computerized music, and released it under the odd name of "Classical Mosquito." (The title came to him when he first heard the playback—it sounded like that pesky buzzing insect.) It cost Robb $1,200 to have 500 copies of his record made. At press time he'd sold almost 300 copies. Radio stations in Chicago (where Robb lives) and across the nation have played the record on the air, and he's getting orders from all over the country.

The music probably is different from any that you've heard before It sounds like a tinny electric organ.

Robb says his record was inspired by *Switched on Bach*, a 15-year-old album of classical pieces played on a synthesizer. But "Classical Mosquito" songs aren't synthesized versions of classical tunes. They're original pieces composed on the computer. Robb explains, "The difference between this and a synthesizer is that you don't have to be a keyboard player to get some really good sounds." He uses a Radio Shack TRS-80 and *Orchestra 90* software.

By day, Robb is an educational software designer for Davka Corporation in Chicago. (You may know his adventure game, *The Lion's Share*, or another game he's worked on called *Bible Baseball.*) —KEN COACH

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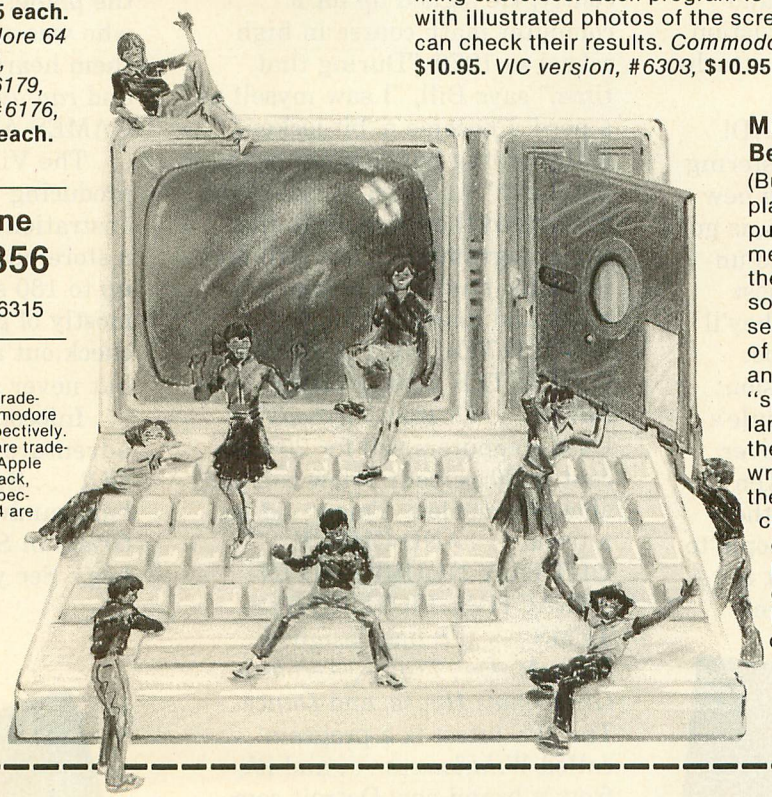
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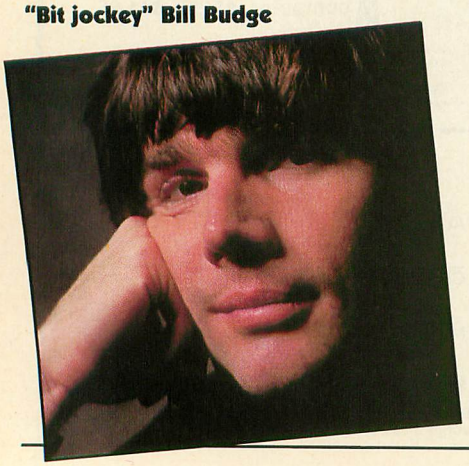
Silicon ALLEY

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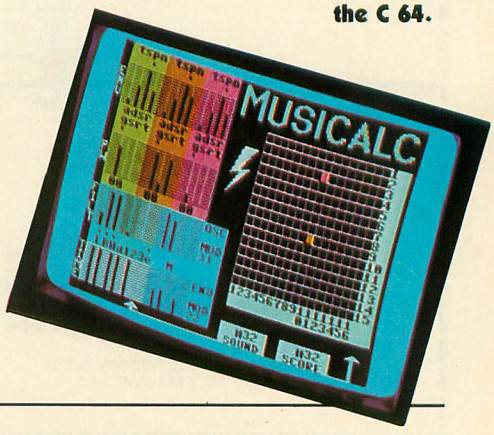
MORE MUSIC MORE MUSIC MORE . . . Wait! Just minutes ago, I got a look at the most amazing music software yet! With the *MusiCalc 1* program (from the Waveform Corp. of Berkeley) and the Commodore 64's SID (Sound Interface Device) chip, you can do almost anything! *MusiCalc 1 — Synthesizer & Sequencer* makes it easy to compose music, alter the tones of the 64's three voices, or play along with music that's stored on the disk. (Too bad the Talking Heads didn't get to see it . . . they'd have loved it to *death*!) Coming next from Waveform: a keyboard instruction disk 2 called *ScoreWriter*, disk 3 called *Keyboard Maker*, various and sundry other music construction disks, and . . . a keyboard attachment for your 64!. . .

HIT 'EM OVER THE HEAD! . . . That's what Ken "Mastering *Pac-Man*" Uston says. His new company, Fun and Games, is going to be writing simple-to-understand guides for the most widely used computers. They'll be developing software, too. "You've heard the expression that you've got to get a mule's attention by hitting him over the head with a board," Ken says. "Video games were the 'board' that introduced people to computers. Now we've got to show people how to do something useful with them." (Special note to card players: All five team members of Fun and Games were professional card players or dealers!) . . . I WAS A TEENAGE NERD! . . . That's what designer Bill Budge confessed recently. He signed up for a computer math course in high school in 1970. "During that time," says Bill, "I saw myself as a nerd! I became a 'bit jockey,' with nothing but computers on my mind." Later on in college he discovered there's more to life than programming, but still finished his studies in computer math and science at Berkeley. . . WOULD YOU BUY A USED COMPUTER FROM THAT MAN? . . . Or from *anybody*? Used computers sell for 20 percent to 30 percent below comparable new models. This could be a trend . . . AND CHECK OUT GUY NOURI AND INTERACTIVE PICTURE SYSTEMS . . . IPS has designed *MovieMaker*, *Trains*, *Aerobics*, *Grandma's House*, and *Dance*. The IPS latest is a program called *Wildflowers* . . . and it's from a brand-new Detroit company called LYNX! Watch this space for more on IPS and Lynx . . . NUMBER ONE WITH A BULLET! . . . That's what Capitol Record's new software division plans on being—the number one supplier of floppy disks for personal computers. They think computers will be as commonplace as telephones in the not-too-distant future, and floppy disks will be available at supermarket checkout counters, right next to the gossip mags! Sales of floppy disks reached $350 million in 1982, and are expected to hit the $2 billion mark by 1987 . . . NOW WHAT DO I DO? . . . Jerry Jewell, at Sirius, told us this one. A father and son game-designing team were standing in a line, discussing their latest project, *Critical Mass*. The son said, "OK, after I get the bomb and get on the airplane, what am I supposed to do with it?" The father answered, "Well, I think you're supposed to blow up the plane!" When the woman who was standing in front of them heard this, she *screamed* and *ran away*! . . . LASERDISK GAMES ARRIVE IN STORES . . . The ViMart corporation is producing video laserdisk demonstration units. Look for one in a store near you. They feature up to 180 software reviews, mostly of games, so you can check out a title you've heard of but never seen . . . HOT RUMOR . . . Infocom's going into *graphic* adventure games . . . GOTTA GO! . . . Bubba's is here with my ham sandwich, and I gotta play *Gruds in Space* with my friend Legs. See ya next issue!

"Bit jockey" Bill Budge



Waveform's *MusiCalc* series shakes up the C 64.



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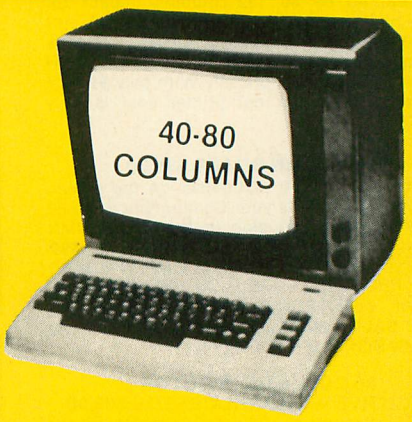
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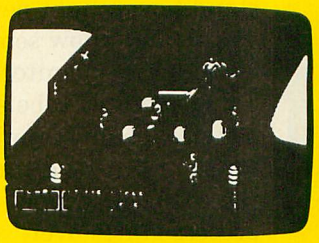
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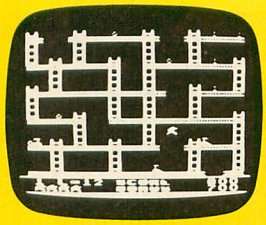
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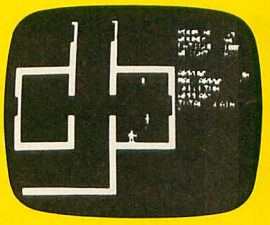


JUMPMAN

If you like Donkey Kong, you'll love Jumpman. Over 30 different screens with 8 speeds and 5 skill levels make this the fastest action game in the country. You must leap girders, climb ropes, and scale ladders to reach and diffuse bombs while avoiding robots, birds, bullets, explosives, crumbling walls, vanishing escape routes, and many other obstacles. (Truly a fantastic game!)

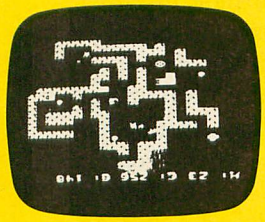
List $39.95 **Sale $27.95** (Disk Only — 64 or VIC 20)

TEMPLE OF APSHAI (computer game of the year)



This is the standard by which other adventure games are judged. Full color graphics portray the temple and all its contents - magic, monsters, doomed cities and damsels in distress. Do battle in real time with over 20 monsters, expansion modules will keep your adventure alive in the future.

List $39.95 **Sale $29.95** (Disk/Tape — 64 or VIC 20)

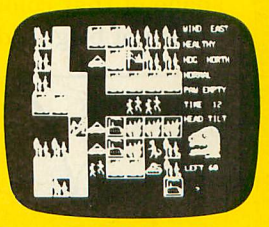


SWORD OF FARGOAL

Search for the wondrous sword in the depths of an ever changing dungeon. Make yourself invisible, teleport to a new location, drink a healing potion or use enchanted treasures, but watch out for traps and hideous creatures who will try to stop you. (Fantastic dungeon adventure)

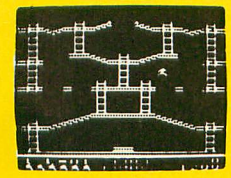
List $29.95 **Sale $21.95** (Disk/Tape — 64 or VIC 20)

CRUSH CRUMBLE & CHOMP (Computer game of the year nominee)



Choose one of six monsters or create your own, and use your monster to destroy one of four unsuspecting cities. The cities aren't totally defenseless, they call on police, national guard, and even a mad scientist, complete with helicopter, to save humanity from the relentless threat.

List $29.95 **Sale $21.95** (Disk/Tape — 64 or VIC 20)



JUMPMAN JUNIOR

The devilish ALIENATORS are back! And they have overrun the Jupiter Command Substation. In this cartridge format sequel to the best-selling Jumpman, players must leap through 12 all new screens featuring electrocution traps, moving walls, hellstones, and dangers much too bizarre to be believed. How many screens can you master? Twelve different screens, 8 speeds.

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DOCTOR KURSOR'S KLINIC



Illustration: Sam Viviano

Making computer music

How does a light pen work?

DR. KURSOR: To really understand how a light pen works, you should know some basics about TV or monitor screens. A TV or monitor tube sends an electron beam scanning the screen a line at a time. When the entire screen is scanned, the process starts over.

The electron beam activates a small area of the phosphorescent coating on the inside of the screen. When the electron beam hits the phosphor, that area starts to glow—with a brightness that depends on the intensity of the beam. A low voltage produces a black, or neutral, image. Higher voltages create shades of grey. The inside of a color screen, on the other hand, is composed of triangles of red, blue, and green dots. When these dots are struck by a beam, depending on the voltage, you get a bright, or not so bright, shade of that color. The combination of bright, dim, and black dots creates the picture.

When the light pen touches or is close to the picture screen, it waits to "see" the electron beam as the beam scans across. The pen tells the computer when it "sees" the electron beam passing by. Because the computer knows where the electron beam is at any instant, it can transform that information into the x and y coordinates of that position on the screen. The computer then processes the information as the currently running program directs and moves to the chosen part of the menu, plots a line element, or whatever.

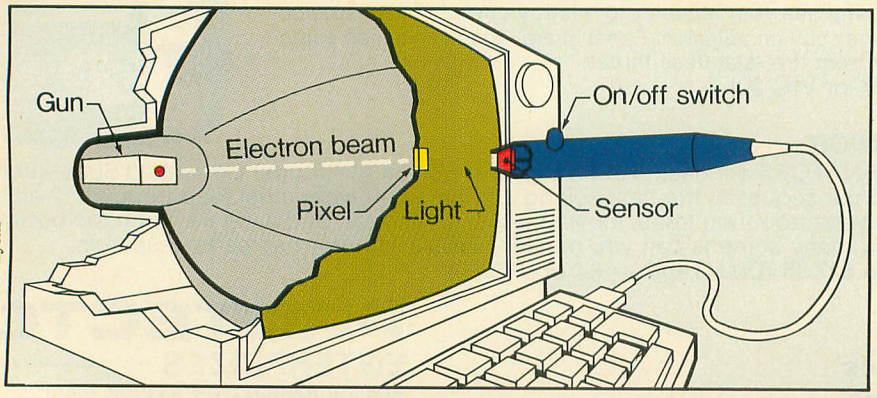


Illustration: Pat Lyons

Which computers play music?

DR. KURSOR: Just about all of the home computers now on the market can. The Atari, Commodore 64, VIC-20, TI-99/4A, and Timex Sinclair 2068 can all play at least three-part harmony through your TV or monitor (some can produce white noise as well). The Commodore 64 has a sophisticated synthesizer chip that gives you exceptional control over the sound produced.

The IBM PC and Radio Shack Color Computer can produce single musical tones at the command of BASIC. The Radio Shack Models III and 4 and Apple computers require machine-language routines to play even one note at a time, and you have to supply external speakers for the Models III and 4. Plug-in synthesizers are available for Apples, Radio Shacks, and other computers to expand their musical capabilities. Some games written for the ADAM can also create music, but the ADAM manual does not explain how to write programs with sound.

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Networkers from seven spots around the U.S. already are on-line. Five more to go. Don't waste your big chance to write and tell us why you should be the next to connect! K-POWER will give you a modem and pick up the K-NET networking tab for a year.

Interested? Let us know! Tell us about yourself, your age, where you live, the kind of computer you have, anything else you think is interesting, and why you want to be part of the K-NET connection.

Give us the lowdown on your computing experience and answer these questions:

Is computing a fad? How do you see it fitting into your life five years from now?

Send your entry to K-NET, c/o K-POWER, 730 Broadway, New York, NY 10003. March 25th is our deadline. After that, who knows, you may see your face here each month—as a K-NET regular!

Where will the computer age bring us?

Eric Saberhagen, 13
Tom Saberhagen, 11
Albuquerque, New Mexico

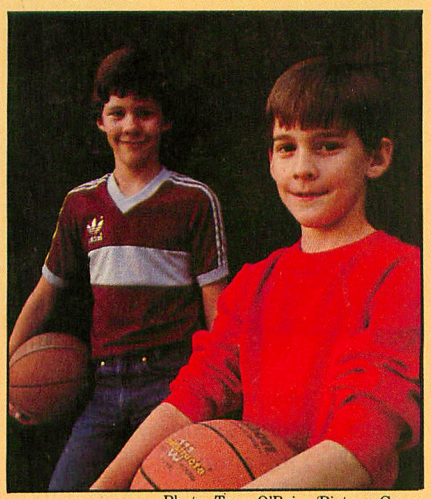


Photo: Tony O'Brien/Picture Group

"In 1973, who would have guessed you could buy a computer for $50? In the future, computers are going to be a lot better, but it's impossible to even guess what they are going to have. I don't think anybody can."—ERIC S.

"Computers will probably get a lot easier to program and have a lot better games. They'll get more into videodisks where you could play back actual pictures. I say that in about 10 years, everybody will have a computer in their house. And if they get better at robotics, there will be a lot more of that."—TOM S.

Eric Fisch, 14
St. Paul, Minnesota



Photo: Steve Wort/Picture Group

"We are going to see smaller, more advanced computers—and at a much lower price."—ERIC F.

Tom Peterson, 14
Vancouver, Washington

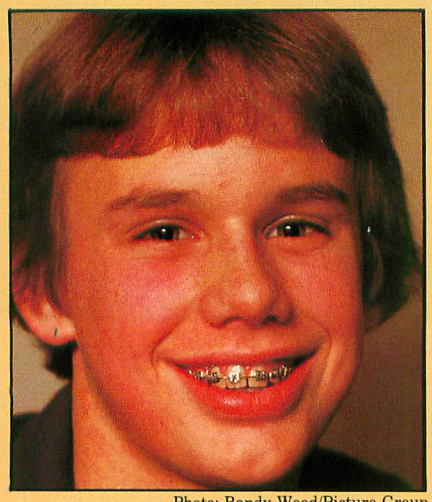


Photo: Randy Wood/Picture Group

"Things like modems are going to be really popular for communication purposes. And robotics. People will be able to hook up new and interesting pieces of equipment to their computer and program it to do different things." —TOM P.

Jodi Moskowitz, 12
Scott Moskowitz, 9
Toledo, Ohio

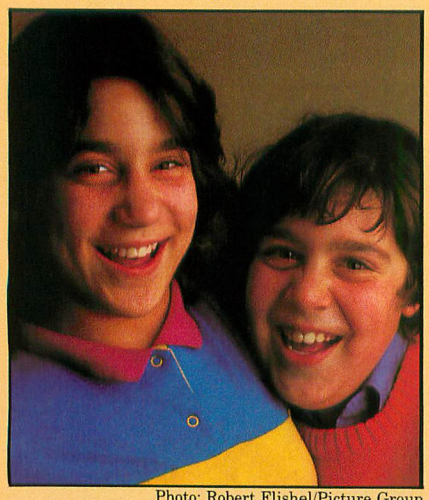


Photo: Robert Flishel/Picture Group

"Probably anyone who could afford one would get one. Also, they'll keep coming out with more computer stuff for schools." —JODI

"More people will start buying them and there'll be a lot more new games and programs. Houses could even be controlled by computers. They're planning that. When I want to get my breakfast cooked, I'll just have to say 'I want eggs' and get it." —SCOTT

Steve Horowitz, 16
Dan Horowitz, 14
Westport, Connecticut

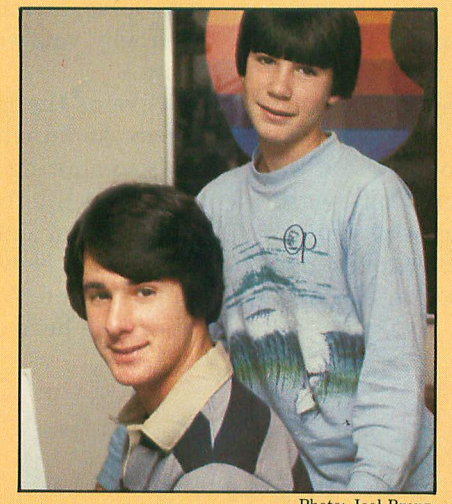


Photo: Joel Bronz

"You'll probably start seeing them in places where human error is a factor, like air-traffic control. I definitely think that computers will take away jobs. That's kind of a depressing thought!" —STEVE

"More people will be communicating with computers than with telephones and other communications. Most things will be computerized and most people in America will have a computer in their house. It will be as normal as an oven." —DAN

Jill Bassett, 12
Miami, Florida



Photo: Jonathon Utz/Picture Group

"I think that there will be more and more computers in businesses than ever before. And in homes people are going to feel pressure that they have to have one." —JILL

Dara Cook, 9
Tuckahoe, New York

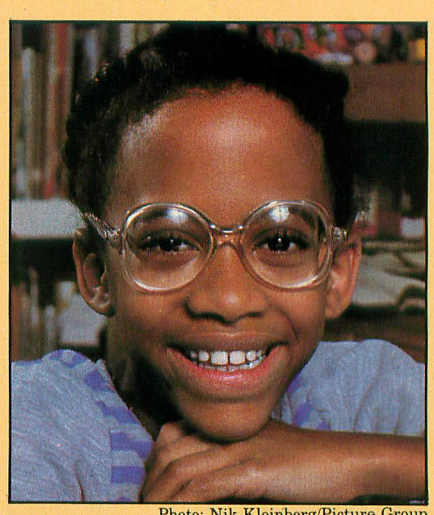


Photo: Nik Kleinberg/Picture Group

"They are going to make more cartoon games where you tell the character what to do. Also, they're gonna make movie theaters where you have a computer next to you and you can control what happens." —DARA

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Computer Camp-Out

Getting down to BASICs. Sun and fun and floppy disks. Late nights sitting around the micro. That's life at computer camp. Pack your bags and head for any one of these hacker camps—where programming mixes with pleasure.

By Mike Benton

Champlain College Computer Camp
Burlington, Vermont
Who: Beginner, intermediate, advanced. Ages 10 to 16.
When: Four two-week sessions, two four-week sessions, and one eight-week session. (One one-week day-camp session.) All are held from late June to mid-August.
What: BASIC, FORTRAN, Assembly, Pascal
Computing hours daily: Four–six
How much: $825 for two-week session; $1,600 for four-week session; $3,200 for eight-week session.
Contact: Shelley Richardson, Director, Champlain College Computer Camp, P.O. Box 670, 163 S. Willard St., Burlington, VT 05402; (802) 658-0800.

CompuCamp
Beaver Falls, Pennsylvania; Newberg, Oregon; St. Paul, Minnesota; Orange, California; Greeley, Colorado; Rohnert Park, California; Kenosha, Wisconsin; Omaha, Nebraska; Washington, D.C.; Seattle, Washington; other locations planned for 1984

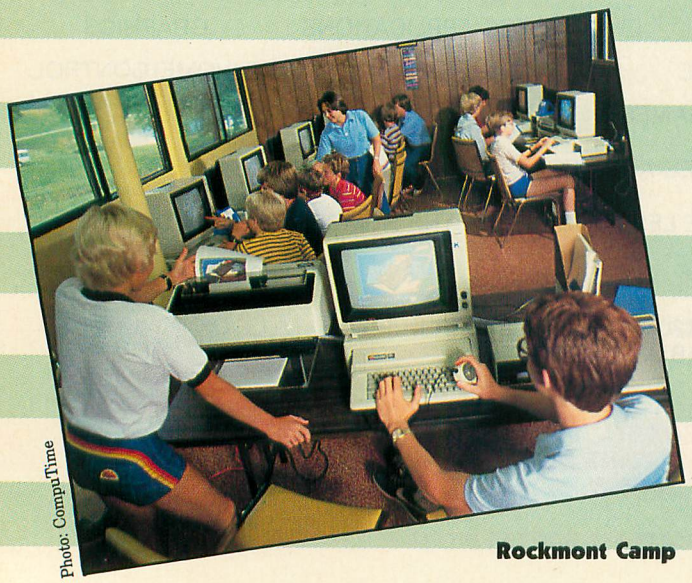


Photo: CompuTime

Rockmont Camp

Who: Beginner, intermediate, advanced. Ages nine to 17.
When: One- and two-week sessions, June through August. Sessions may be repeated or combined. Fifty campers per session.
What: BASIC (all levels), Pascal, Assembly, Logo
Computing hours daily: Six–10
How much: $850 to $900 for two-week session; $425 to $500 for one-week session. Each additional week: $390 to $450. (Family, group, and early sign-up discounts available. Prices depend on location.)
Contact: Kathryn Thomas, Executive Director, CompuCamp, 5810 W. 78th St., Minneapolis, MN 55435; (612) 835-0064.

Computer Camp for Youth
Provo, Utah
Who: Beginner, intermediate, advanced. Ages 10 to 18.
When: Four two-week sessions from late June through mid-August. Forty campers per session.
What: BASIC, Logo, Assembly, Pascal
Computing hours daily: Five (and up)
How much: $495 for 12-day session ($350 tuition plus $145 for meals and lodging).
Contact: Continuing education, Brigham Young University, Provo, UT 84602; (801) 378-6757.

Computer Camps International
Denton, Texas; other locations planned for 1984
Who: Beginner, intermediate, advanced. Ages eight to 17.
When: Two-week sessions, mid-June to mid-August. (Campers may attend more than one session.)
What: BASIC, Logo, APL, PILOT, Assembly, Pascal
Computing hours daily: Four–five
How much: $895 for one session. For campers who combine two or more sessions, a small addi-

tional cost is charged for the weekend stay.
Contact: Marvin Weinberg, 281 Hartford Tpk., Suite 506, Vernon, CT 06066; (203) 871-9227.

Computer Fest
Madison, Wisconsin
Who: Beginner, intermediate, advanced. Grades one to 12.
When: Six one-week sessions for students in grades seven through 12 (residential and day camp). Four three-week day-camp sessions for students grades one through six. (Meets half-day only.)
What: BASIC, Logo
Computing hours daily: Four–six
How much: $300 for one-week residential session ($200 day-camp option); $150 per three-week day-camp session. (Half-day classes.)
Contact: Enrollment, 225 N. Mills St., Madison, WI 53706; (608) 263-6987.

Computer Tutors
Williamstown, Massachusetts; Palo Alto, California; Portola Valley, California; Swarthmore, Pennsylvania
Who: Beginner, intermediate, advanced. Ages 11 to 17.
When: Two-week sessions, June through August. Campers may combine sessions, which are held back to back, for one long stay at camp. Day-camp option also available.
What: BASIC, Logo, Pascal
Computing hours daily: Five (and up)
How much: $895 for two-week residential session; $595 for two-week day session.
Contact: Lynne McDaneld, 980 Magnolia Ave., Larkspur, CA 94939; (415) 461-7533.



Photo: CompuTime

Rockmont Camp

Duke University Computer Kamp/DUCK
Durham, North Carolina
Who: Beginner, intermediate, advanced. Ages eight to 17.
When: Four 12-day residential sessions. One five-day nonresidential day-camp session. From mid-June to mid-August.
What: BASIC, Pascal
Computing hours daily: Six
How much: $750 for each residential session;

Cutting Camp Costs

Going to computer camp can cost big bucks. Many camps charge $350 to $400 per week or more. Short on cash, but still wanna go? Here's how:

Get a scholarship. Several camps offer scholarships or "camperships" to students who don't have a lot of money. Your best shot is good grades or computer abilities. Write to the camps you're interested in and ask if they offer any financial aid.

Attend camp just during the day. If you live near a computer camp, you may be able to stay at camp during the day, and go home for meals and sleep. Many camps offer 35 percent to 50 percent off for "day campers." You still learn a lot, but can save a lot, too.

Look for nonprofit camps. The Boy Scouts, Girl Scouts, and YMCA organizations have computer camps all over the country. They're often pretty cheap—about $125 to $175 for a full week at camp, including meals and lodging. These camps may not be as big as the major computer camps, which cost two to four times as much, but you still learn new computer skills, and can have just as much fun.

Get a job at computer camp. You can pay for part or all of your computer camp session by working at a camp. You should know enough about computers to help the teachers and counselors at a camp. It helps if you've been to camp before. See "Calling All Counselors" for more details.

—M.B.

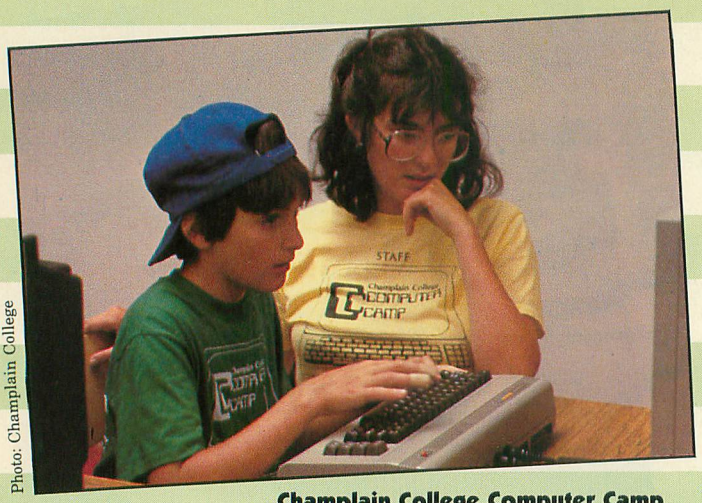


Photo: Champlain College

Champlain College Computer Camp

$350 for day-camp session.
Contact: Barbara Kunz, Duke University, The Bishop's House, Durham, NC 27708; (919) 684-6259.

Lake Forest Computer Camp
Lake Forest, Illinois
Who: Beginner, intermediate, advanced. Ages 10 to 16.
When: Eight one-week sessions from mid-June to mid-August. Campers may repeat sessions. Approximately 65 campers attend each session.
What: BASIC, Assembly, Pascal
Computing hours daily: Six–10
How much: $375 for one session. (Day students may also attend for approximately $50 less.)
Contact: Dr. Lowell Carmony, Lake Forest College, Sheridan and College Rds., Lake Forest, IL 60045; (312) 234-3100.

Marist Computer Camps
Poughkeepsie, New York
Who: Beginner, intermediate, advanced. Ages 10 to 17.
When: Two-week sessions, early June to mid-August. (Students may attend more than one session.)
What: BASIC, APL, Pascal
Computing hours daily: Five (and up)
How much: $850 for each two-week session. Limited amount of financial aid for academically qualified students who demonstrate a financial need.
Contact: Dr. Lawrence Menapace, Marist College, Poughkeepsie, NY 12601; (914) 471-3240, ext. 345 or 228.

Mary Baldwin College Computer Camp
Staunton, Virginia
Who: Beginner, intermediate, advanced. Ages nine to 17.
When: Two-week sessions from mid-July to mid-August for ages 12 to 17. One-week session for ages nine to 11.
What: BASIC (all levels), Pascal for those who've had BASIC
Computing hours daily: Five (and up)
How much: $595 for two-week session (day-camp option available for $375); $345 for one-week children's camp (day-camp option is $195).
Contact: Don Wells, Mary Baldwin College, Staunton, VA 24401; (703) 885-0811.

Midwestern Computer Camp
Lawrence, Kansas
Who: Beginner, intermediate. Grades seven to 12.
When: Three one-week sessions for junior high school students in June. One-week session for senior high students in July.
What: BASIC
Computing hours daily: Six (and up)

Calling All Counselors

"It was great! I got to stay at camp for six weeks almost for free. I could use the computers day and night, and I got to help some of the younger kids program for the first time!"

That's a rave review from Jeff. He's a 16-year-old computer camper who worked at a camp last summer. He got a counseling job because he wanted to learn more about computers by teaching others how to use them. You can, too.

A teaching or counseling job at summer camp can pay you in money and in valuable experience. Here's how to do it:

1) You need to be at least 12 to 14 years old. Most student teachers or "counselors in training" are 14 to 17 years old, but if you've been to camp several times at a young age, you might be able to get a job if you're younger.

2) You should have attended a summer camp (although not necessarily a computer camp) for one or two summers. Or, you should have a pretty outstanding background in computers.

3) You should be responsible, mature, and willing to spend as much time as it takes to help other campers learn about computers and enjoy summer camp more. (This may be a lot more trying than you think! See 16-year-old counselor Matt Davis's personal experience, pictured on the next page!)

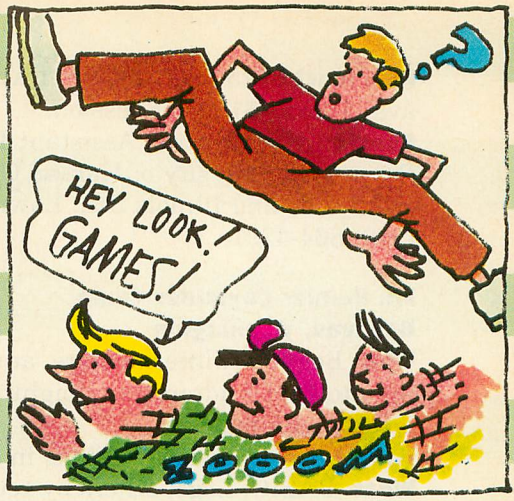
—M.B.

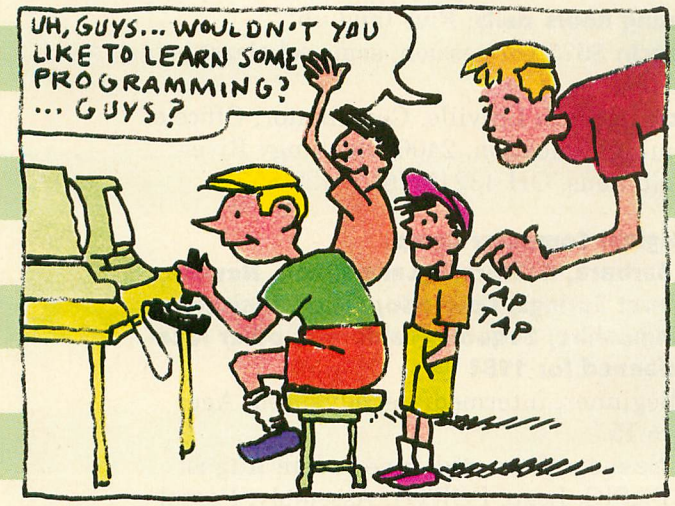
COMPUTER CAMP COUNSELOR

by M. Brookhart Davis

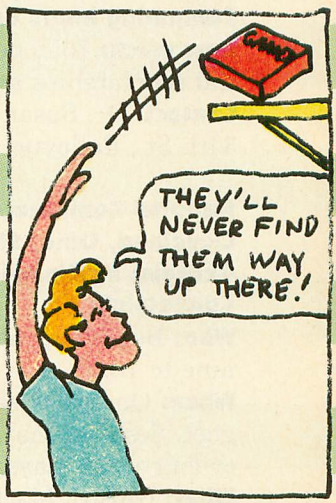






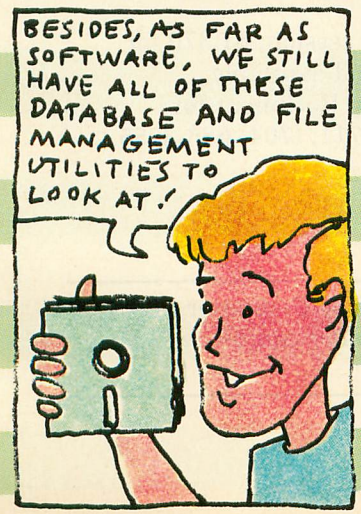


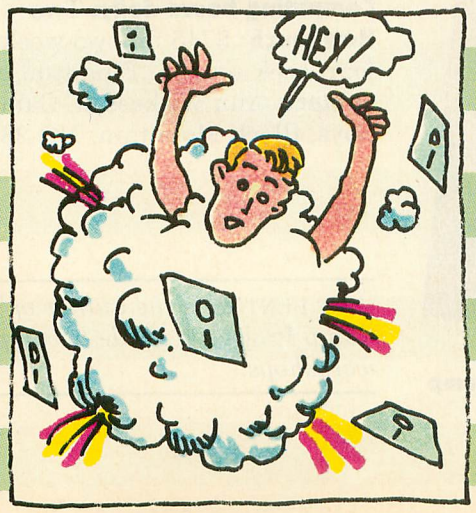


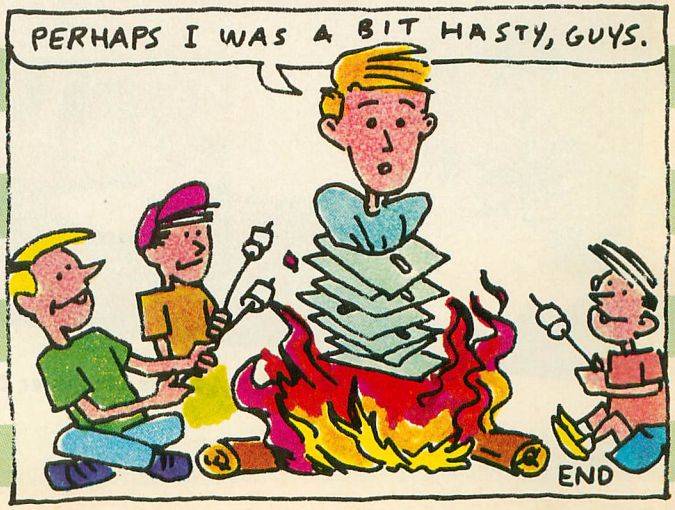












How much: $250 per session. Day-camp option available at $180 per session.
Contact: Herb Harris, Assistant Director, User Services, University of Kansas Computer Center, Sunnyside and Illinois Sts., Lawrence, KA 66045; (913) 864-4291.

Mt. Rainier Computer Camp
Bellevue, Washington
Who: Beginner, intermediate, advanced. Ages nine to 14. Children six to eight years accepted if emotionally mature.
When: Two one-week sessions in July.
What: BASIC, Logo, others by request
Computing hours daily: Five (and up)
How much: $350 per session. Some full and partial scholarships available.
Contact: Dr. Susan A. Whitt, Director, 9061 N.E. 34th St., Bellevue, WA 98004; (206) 453-8790.

National Computer Camps
Cleveland, Ohio; St. Louis, Missouri; Atlanta, Georgia; McMinnville, Oregon; Simsbury, Connecticut
Who: Beginner, intermediate, advanced. Ages nine to 18.
When: One-week sessions, late June through August. Sessions may be combined for two-, three-, or four-week stays.
What: BASIC, Machine Language, Pascal
Computing hours daily: Five (and up)
How much: $380 for one-week session; $390 for each additional one-week stay (including over the weekend).
Contact: Michael Zabinski, Ph.D., P.O. Box 585, Orange, CT 06447; (203) 795-9667.

Northern Illinois University Computer Camps
Oregon, Illinois; DeKalb, Illinois
Who: Beginner, intermediate. Ages 9 to 17.
When: Seven one-week sessions from mid-June to mid-August. Approximately 40 campers per session.

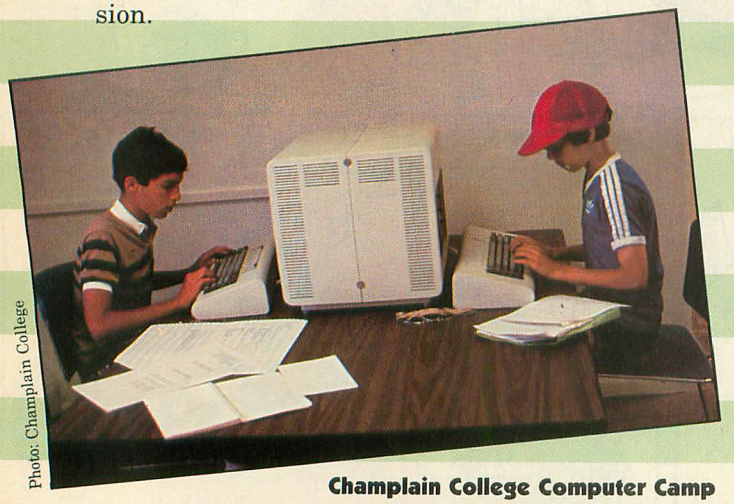


Photo: Champlain College

Champlain College Computer Camp

What: BASIC
Computing hours daily: Seven
How much: $280 for residential session, $220 for day session (DeKalb); $290 and $230 (Oregon).
Contact: Deborah A. Brue, College of Continuing Education, Northern Illinois University, DeKalb, IL 60115; (815) 753-1454.

Ohio State University Computer Camp
Columbus, Ohio
Who: Beginner, intermediate. Ages 12 to 16.
When: Four two-week sessions, mid-June to late July.
What: BASIC, Assembly, Pascal
Computing hours daily: Five (and up)
How much: $675 per session, some scholarships available.
Contact: Deborah Linville, Coordinator, Office of Continuing Education, 2400 Olentangy River Rd., Columbus, OH 43210; (614) 422-8571.

The Original Computer Camp
Santa Barbara, California; Lake Tahoe, Nevada; Steamboat Springs, Colorado; Lake Winnisquam, New Hampshire; Sequoia, California; other locations planned for 1984
Who: Beginner, intermediate, advanced. Ages seven to 15.
When: Sessions from mid-June to late August.
What: BASIC, Logo, FORTH, Assembly, Pascal
Computing hours daily: Four–six
How much: $895 for two-week session; $1,790 for four-week session. (Prices vary depending on location of camp.)
Contact: Reservations, 559 San Ysidro Rd., Santa Barbara, CA 93108; (800) 235-6965 or (805) 969-7871.

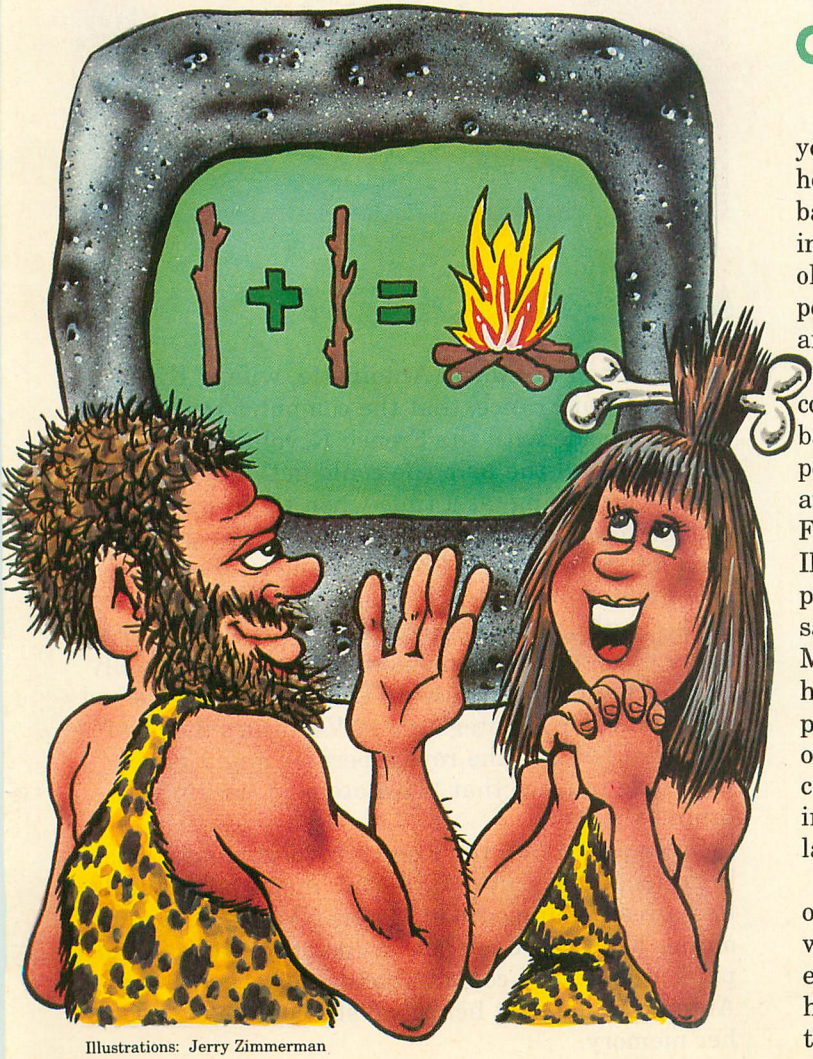
Rockmont Camp
Black Mountain, North Carolina
Who: Beginner and advanced. Boys from age 7 to 16.
When: Two-week and four-week sessions. June through August. (Sessions can be repeated.)
What: BASIC, Logo, Assembly
Computing hours daily: Two
How much: $745 for two-week session; $1,370 for four-week session. Financial aid available.
Contact: Ann Wilkerson, Camp Rockmont for Boys, Black Mountain, NC 28711; (704) 686-3885. □

MIKE BENTON *is the author of* The Computer Camp Project, *a guide to computer camps and workshops.*

FAMOUS HACKERS IN HISTORY

Ever wonder how history could have been changed by computers? Who cares, right?

by Jane King



Illustrations: Jerry Zimmerman

CAVE COUPLE

Believe it or not, thousands and thousands of years ago, during the Stone Age, there were no home computers. They only had CAVE computers back then! The cave computer (CC), primitive cousin to our modern day PC, was very BASIC. Archaeologists have actually dug up some fossils of CC peripherals! Although crude, a joystick and a paddle are both recognizable.

What did the up-to-date cave couple use their computer for? Cave management, of course! Let's go back . . . back . . . wa-a-a-a-ay back in time and peek in on the cave of Peking man and wife, Mr. and Mrs. T. Bone. Mrs. Bone, whose first name is Fern, is saying to her husband, Tarpit, "ROM RAM IR ACK NAK BOT!" That's cave talk for "You must put a door on this cave of ours, dearie. The dinosaurs have been messing with the computer again." Mr. Bone is using the CC to figure out precisely how many rocks are in a boulder, and how many pebbles are in one rock. Fern uses the CC to sort out her cavehold chores. Her special strata file for cave inventory lists every item in the entire dwelling, from her expensive animal tooth-and-nail necklace, right down to the last piece of gravel.

The typical cave couple was up against terrific odds. They had to deal with a harsh climate. There were fierce people-eating beasts lurking behind every volcano. But couples like Fern and Tarpit Bone had their own brains and cave computers to boost them up, up, up the evolutionary ladder.

SIR ISAAC NEWTON

One day, in merry old England, around the year 1666, young Isaac Newton was sitting in a garden, sipping a cup of tea, when an Apple fell on his head and knocked him out cold. Contrary to popular belief, it did not fall from a tree. The Apple II plus fell from a passing delivery cart making a carriage return to London. "I say, that jolly well smarts," said young Isaac when he finally came out of his passive mode. "That was one heck of a load, and this is one heck of a bump on my head." The more the bump on his bean hurt, the more he thought about the mass and distance of a certain falling object. If that computer hadn't accidentally fallen on him, Isaac Newton (he didn't become a "Sir" until Queen Anne knighted him in 1705) might never have developed his theory of gravitation.





Illustrations: Jerry Zimmerman

MARIE ANTOINETTE

It's too bad for Marie Antoinette, wife of King Louis XVI of France, that the computer revolution didn't coincide with the French Revolution, because she needed all the help she could get! Marie was famous for saying, at a time when there wasn't enough food, "If the people have no bread to eat, then let them eat cake! At least a byte of cake . . . or a nibble off a Twinkie, even!"

The truth is that an error was made here! Marie never uttered the infamous remark. It was actually Marie Therese, wife of King Louis XIV! If there had been a home computer around Versailles (home of the royal family), the royal operator might have been able to trace that DIM statement back to its origin.

In October 1793, the French revolutionaries finally decided to execute Marie Antoinette (after they had already dumped King Louis XVI) by chopping off her head. Here is another instance where a computer would have come in handy, for even if Marie Antoinette had lost her head, she could have kept her memory.

NAPOLEON BONAPARTE

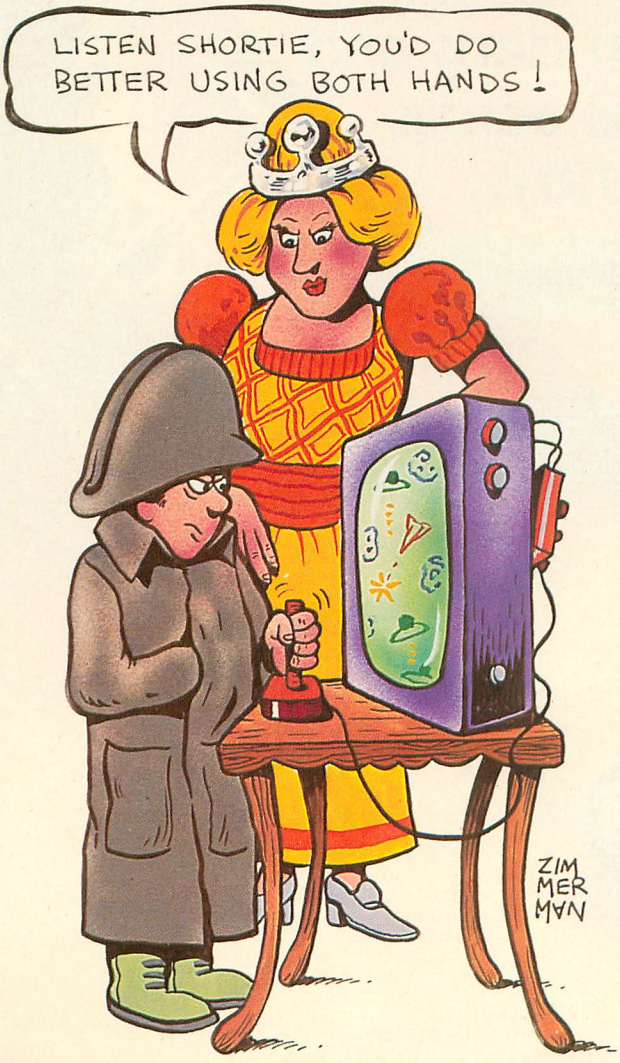
If Napoleon had known how to use his home computer better, there wouldn't have been a French Revolution! Instead, he'd have been hunched over his desk, devising new military strategies. He wouldn't have had time to invade Russia and throw France into chaos.

As head of France's military, he used a general-purpose computer, of course. He'd hang around the Malmaison, his summer home, giving commands to his Commodore.

Eventually, Josephine found that her hacker-of-a-husband was getting in the way. "Nappy, sweetheart, why don't you be a dear and go visit Waterloo or something, huh? The girls are coming over to play *Q*Bert*," she said.

"*Sacre bleu,* Josephine," Napoleon grumbled. "Stop nagging me. Can't you see I'm playing *Escape from Elba*!?"





LUDWIG van BEETHOVEN

Ludwig van Beethoven, the great German composer of the 19th century, was an irrepressible cursor . . . until he got hold of his first computer! After that, he cursed a little bit less. "You all haf artificial intelligence, you bleepity bleep bozos, you!" he'd scream at his captivated audiences. Although he wasn't exactly "Mr. Congeniality of 1803," everybody always forgave Beethoven. After all, he was such a talented guy, and a musical genius, what else could you do?

Before Beethoven's home computer arrived, he was rarely satisfied with his written music, because he felt it didn't live up to his improvisational stuff. After he got his computer, he picked up a copy of the *Music Construction Set.* Now, he could improvise while the computer programmed the notes. He made all his revisions with a goosefeather light pen, right on the screen. (By the way, Beethoven played with such crashing force and ferocity, he required an industrial-strength keyboard.)

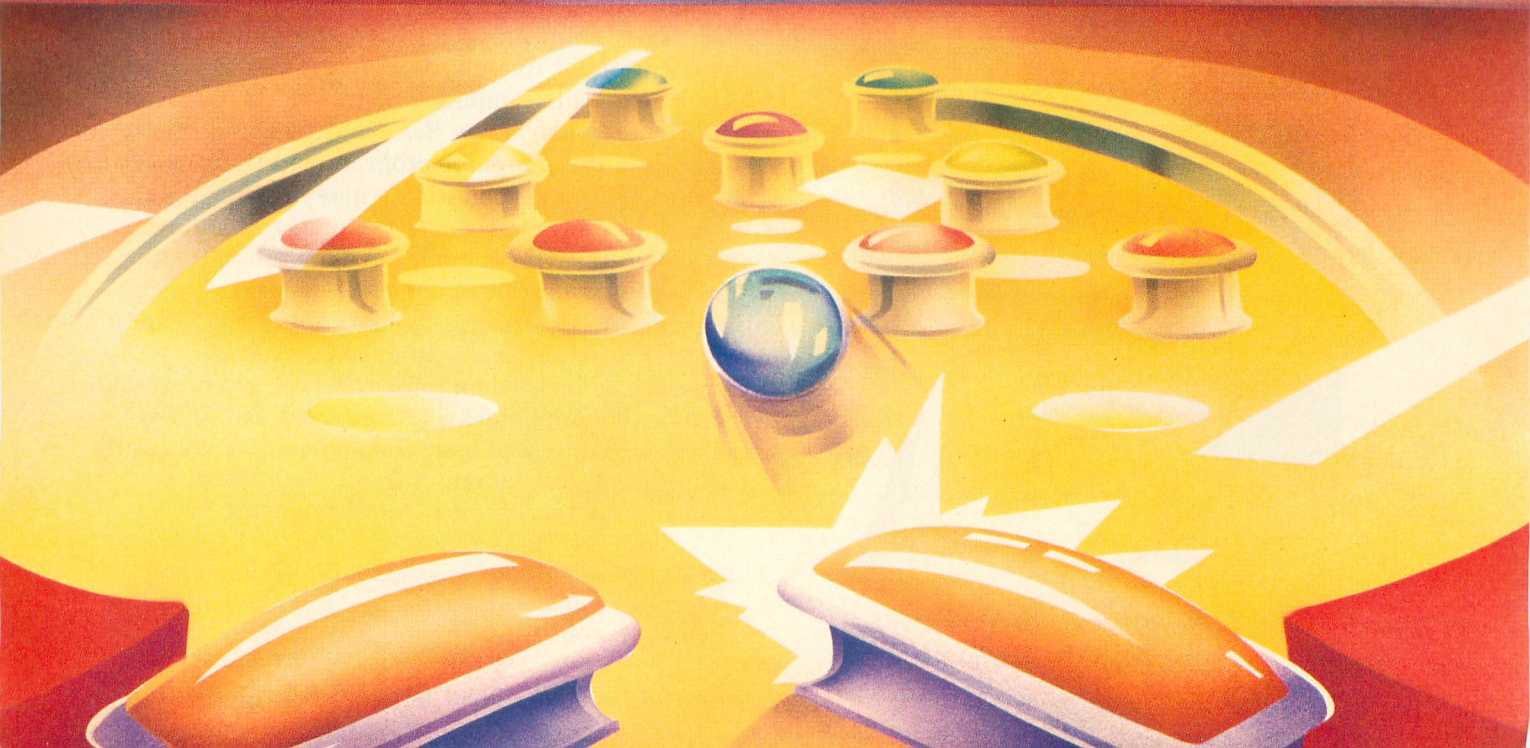
At age 30, Beethoven started to go deaf. Despite his poor hearing, and with customary stubbornness, he insisted on conducting concert programs of his own symphonies and concertos. Sadly, Beethoven's inability to hear the orchestra often resulted in things getting out of hand. As a result he gained a reputation as a "semi-conductor." □

JANE KING *writes comic strips with her husband, John. She's also famous for making fashion videos under her maiden name, Brettschneider.*

Pinball BOUNCES BACK!

Who says pinball is dead? It has a new look, but it's still alive and flipping in dens and living rooms across the country.

By Kenneth Pringle



I always wanted my own pinball machine. Not one of those scaled-down toy models sold in stores. A real, honest-to-goodness, quarter-munching pinball table. You know, like the kind found in pool halls and bowling alleys.

There were two problems: the cost—which was in the several hundreds of dollars range, even for a used one; and my parents' steadfast refusal to allow one of those banging, clanging monsters to invade our family room or garage.

At that time, there was no alternative to a real pinball machine for the home. So my friends and I had to be content hanging out in the local pinball hall, never far away from the pleasure machines.

Pinball comes home

Well, now that we've entered the computer age, it seems anything goes. We shoot down space invaders, guide Pac-Men to eat powerpills, and battle dragons in dungeons. And finally, through the magic of computers—my dream of dreams—we can even play pinball at home—bells, buzzers, and all!

The beauty of computer pinball is that it plays amazingly like real pinball. So what if the board is measured in inches rather than feet.

Saving quarters

Don't think I went into this without any reservations. I needed to be convinced that computer pinball could match the real thing. *David's Midnight Magic*—a Broderbund game designed by David Snider and released in early 1982—impressed me right off the bat.

I was surprised at how realistically the game played. When you shoot the ball onto the playing table—through the use of an adjustable "spring"—it behaves like a true marble on a true table. It's affected by "gravity," and it picks up speed as it hits bumpers and sideboards. When the situation is right, the ball even gets stuck ricocheting between bumpers as the player gleefully watches his point total skyrocket.

Like in real-life pinball, the ball can be "trapped" by a flipper, giving the player better aim and control. A mis-hit can be just as costly as in the real game. The player watches the ball slip between the flippers and out of play, or roll weakly down the side aisle. For the overzealous or hot-headed player, *Midnight Magic* even has a "tilt" mechanism. By tapping the space bar you affect the direction and placement of the ball. Too much tapping can activate the "tilt" and you're out a ball.

After my first five balls of *Midnight Magic,* I immediately called for five more (and almost reached into my pocket for a quarter).

One step beyond

Night Mission (SubLogic) is a game that goes a little further than *Midnight Magic*. It's designed by Bruce Artwick of *Flight Simulator* fame. Although the *Night Mission* board isn't as interesting as *Midnight Magic*'s, it has one great advantage: Nearly everything except the physical setup of the board can be altered.

Gravity can be changed. Plus, the elasticity of bumpers and sideboards, friction, ball speed, flipper power, noise level, and even "tilt" can all be redefined.

In terms of the board, *Night Mission* could use an extra set of flippers, but otherwise it's OK. The ball leaves a trail of ghost images behind it, which is a nice effect. And there's a bumper in the center of the board that sends a flipper-shot ball straight back between the flippers and out of play. Just as frustrating as the real thing.



David's Midnight Magic



Night Mission

Illustration: Richard Timperio

Possibly more frustrating than the real thing is a game by Strategic Simulations, Inc., the company famous for their war games. *Queen of Hearts* is pinball, no construction or modification. It has plenty of flippers (five in all), and the design is decent. But the flippers aren't very responsive, and the ball doesn't react quite like a real pinball. For straight pinball lovers, it'll do.

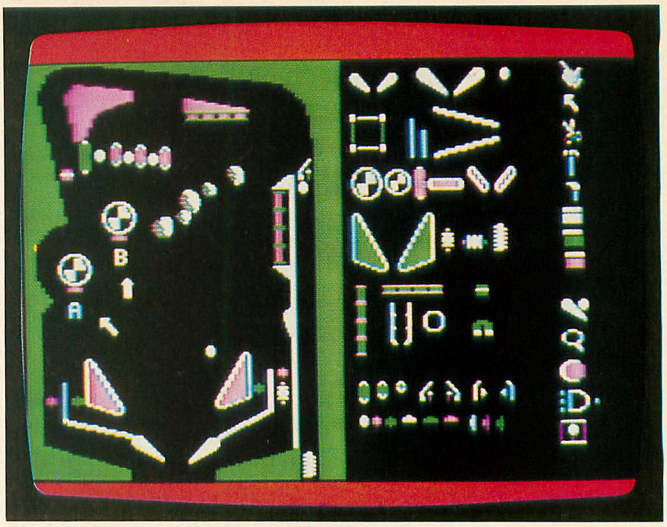
Be your own Bally or Gottlieb

Another computer pinball game, with yet another twist, is Electronic Arts' *Pinball Construction Set.* Designed by Bill Budge, whose *Raster Blaster* of 1981 got the whole computer pinball idea rolling in the first place, *Pinball Construction Set* lets you create your own pinball tables from scratch.

Using a video "hand" controlled by a joystick, you place bumpers and other targets anywhere on the board. Using video hammer and scissors, you can change the shape of the board. Gravity, elasticity, color, and sound all can be controlled.

Pinball Construction Set comes with five sample boards and blank, ready-for-construction boards. These home-designed boards can be played and erased, or be saved to play later.

There are a couple of drawbacks. Because all the computer pinball boards are so small, it's difficult to have pin-point accuracy with the flippers, like you can get with conventional pinball. And there's just a general lack of detail.



Pinball Construction Set

A good pinball player uses everything to his/her advantage, including shoving and hitting the table when necessary (while trying to avoid "tilt"). When playing computer pinball, I just can't help but bang the side of the monitor, even though I know full well it'll have no effect. Old habits die hard. □

KENNETH PRINGLE *is an avid pinball player, as well as a freelance writer and sports editor for a small New Jersey newspaper.*



Pinball Construction Set

HARDWARE REQUIREMENTS: Apple II/II plus/IIe, 48K (disk); Atari 400/800/1200XL, 48K (disk); Commodore 64 (disk); IBM PC (disk); joystick required.
MANUFACTURER: Electronic Arts, 2755 Campus Dr., San Mateo, CA 94403; (415) 571-7171
PRICE: $40

Night Mission

HARDWARE REQUIREMENTS: Apple II/II plus/IIe, 48K (disk); Atari 400/800/1200XL, 32K (disk or cassette); Commodore 64 (disk or cassette); IBM PC (disk); joystick required.
MANUFACTURER: SubLogic Corp., 713 Edgebrook Dr., Champaign, IL 61820; (217) 359-8482
PRICES: IBM PC, $39.95; Apple, $34.95; Atari and Commodore 64, $29.95.

David's Midnight Magic

HARDWARE REQUIREMENTS: Apple II/II plus/IIe, 48K (disk); Atari 400/800/1200XL, 48K (disk); Commodore 64 (disk); joystick(s) required.
MANUFACTURER: Broderbund Software, 17 Paul Dr., San Rafael, CA 94903; (415) 479-1170
PRICE: $34.95

Queen of Hearts

HARDWARE REQUIREMENTS: Atari 400/800/1200XL, 48K (disk); Apple II/II plus/IIe/III w/emulator, 48K (disk); joystick required; disk comes multisided — Apple program on one side, Atari on the other.
MANUFACTURER: Strategic Simulations, 883 Stierlin Rd., Bldg. A-200, Mountain View, CA 94043; (415) 964-1353
PRICE: $34.95

—M.T.

COMPUTER ROCK & SCROLL

Computers are taking over the music scene. And software companies are jumping on the bandwagon to bring music software home to you!

Musicians—rock 'n roll, classical, jazz, you name it! They're all tuning into the computer phenomenon—and loving it! Meanwhile, software manufacturers are making sure *you* don't miss out on the fun. There's loads of software out there for aspiring computer musicians and composers.

First, on the band scene, it looks like everybody's computing! There's Rolling Stones bass guitarist Bill Wyman, who's recording the past two decades of his life on computer. He recently completed a fantasy film called *Digital Dreams*. It's loosely based on Wyman's musical life and his addiction to computers.

Rock star Todd Rundgren was into the computer scene before Wyman. In fact, he first turned Wyman on to computers in the late 70s. Rundgren, 35, first used computers for video work in late 1976, but now writes programs. He created the Utopia Graphics program, named after his band, and licensed it to Apple. The license has since lapsed, but he plans to improve the program and relicense it.

Rundgren can't say he's the only hacker in Utopia, though. The band's keyboard player, Roger Powell, is a consultant for Microsoft.

Jazzman Herbie Hancock is into Apples. Using an Apple II, he recently finished a solo synthesizer album—in his garage. He successfully linked all of his instruments together and played them from just one keyboard.

Some artists are making computer music without any computing experience. Guitarist Al DiMeola used a Fairlight CMI (Computer Musical Instrument) throughout *Scenario*, his latest album, without any computer know-how.

So what's all this got to do with you? Now, wonder of wonders, you can program an actual Joey Ramone song into your computer, and play your own computerized song! Plus, you can read what Talking Heads Tina Weymouth and Chris Frantz think of music software, and find out how 17-year-old Will Harvey designed *Music Construction Set*. □

Music software for your computer

Anything is possible with the right hardware and the current music software. You can sing along to your favorite songs, or write your own hit rock and roll song! A list of some of the music software out there starts here and continues on the next eight pages.

ADVANCED MUSIC SYSTEM—Generate music by entering notes that can be played by each of the four voices. Can copy or play back. Comes with five sample classical pieces.
HARDWARE REQUIREMENTS: Atari 400/800/1200XL, 32K (disk); BASIC
MANUFACTURER: Atari Program Exchange, P.O. Box 3705, Santa Clara, CA 95055; (800) 538-1862
SUGGESTED RETAIL PRICE: $29.95

ATARIMUSIC I and II—Learn how to read music through self-guided instruction, drills, and games. The first program teaches note reading and whole and half steps. The second program covers major scales and keys.
HARDWARE REQUIREMENTS: Atari 400/800/1200XL, 16K (cassette), 24K (disk)
MANUFACTURER: Atari, 1312 Crossman Dr., P.O. Box 61657, Sunnyvale, CA 94086; (800) 538-8543
SUGGESTED RETAIL PRICE: $39.95

DANCING FEATS—Compose your own melodies or play your favorite songs. Plays music with coordinating graphics. Won't let you hit a wrong note.
HARDWARE REQUIREMENTS: Atari 400/800/1200XL, 32K (disk); joystick

→

Type Design and Lettering: William Kefauver

THE TALKING HEADS TALK SOFTWARE



Talking Heads Tina and Chris take a look at music software.

by John Holmstrom and Michael Tuomey

K-POWER wanted the professional musician's opinion of the latest music software, so we asked two of the Talking Heads to visit and lend an ear. (You may have recently seen the Talking Heads in their "Burning Down the House" video on MTV, or heard Chris Frantz and Tina Weymouth perform as the Tom Tom Club.) Drummer Chris and bassist Tina were curious enough to stop by, but, once they did, they seemed a little mystified by all the disk drives, monitors, and computer keyboards we had set up for them. After his first encounter with a computer keyboard, Chris said, "I feel strange . . . the sight of this keyboard is strange . . . DELETE—delete *what*???" After playing a few games, they loosened up and felt more comfortable with the computers.

We selected software from two of the major types on the market today: composing and synthesizing. First, Chris and Tina looked at Will Harvey's *Music Construction Set*, which lets you compose music on the Apple and then play back what you've written (with the help of a Mockingboard that enhances the sound of the Apple, and two speakers).

Chris thought the program was best for people who really know music. He said, "Visually, it's interesting. You use this joystick [or keyboard or Koala-Pad] to move notes around the staff. Once you've created something, you can play it for your friends and say, 'this is what I wrote!' " Tina thought it wasn't immediate enough, though. She wanted to be able to just touch the screen and have the notes instantly appear on the staff.

Synthesound 64 (HesWare) is more like what Chris and Tina are used to. It converts the Commodore 64 into a synthesizer and produces a tremendous variety of musical notes and noises. The keyboard alters tones and plays like a piano keyboard.

They thought *Synthesound 64* was a bit intimidating, though. There's a lot of reading that has to be done before you can do anything on it. And you have to know your way around a computer keyboard to get good results. But they thought the Commodore 64's sound was better than the Apple's. And they felt it was very important to be able to manipulate the tones and get away from simple computer "beeps" and "boops."

After examining the music software, they began to see more uses for it. Chris thought it was really great that the programs allowed you to save whatever music you wrote on a disk. "People like us, though," said Tina, "when we get an idea for a song we'll just take out an itty-bitty tape recorder and hum it."

Then they started thinking of how *they* would design music software. Tina thought of a program that would teach music theory in an easier, more inviting way, and one that would teach how to play music. "It would be great if they showed pictures of, for instance, how to play something on a guitar or piano. They could show this finger here and that one there. Like when the Beatles were first on TV. When the camera moved in for a close-up on their fingers, I said, 'Oh, wow! So *that's* how they do it!' "

As much as they enjoyed checking out the home computer scene, Chris and Tina agreed that computers are only as good as the people who use them. "I think the mind is the best computer," Tina said. "And, in music, the ears are the best tool. Taste helps, too." □

Type Design and Lettering: William Kefauver Photo: Deborah Feingold

MORE MUSIC SOFTWARE

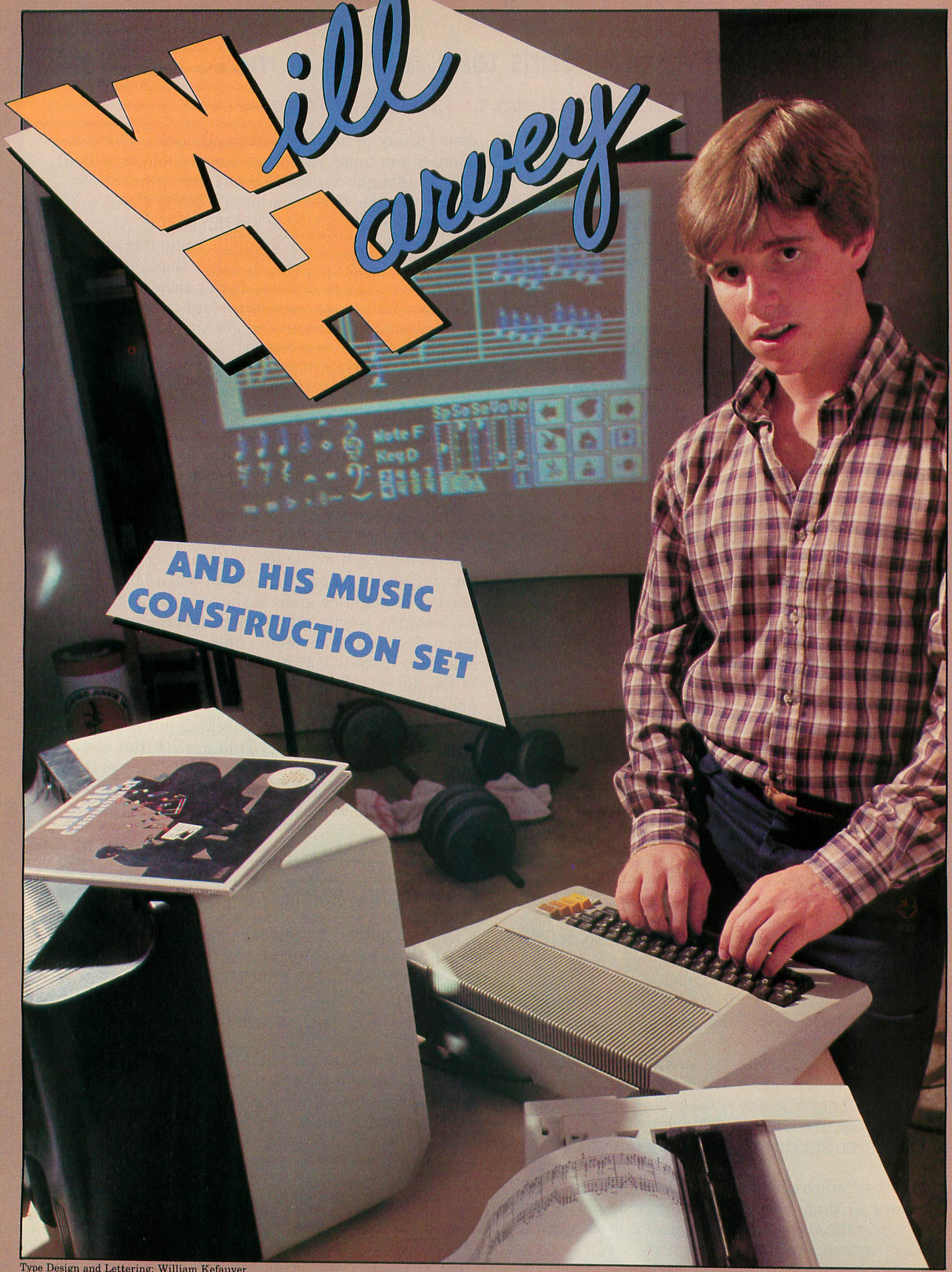
MANUFACTURER: Softsync, Inc., 14 E. 34th St., New York, NY 10016; (212) 685-2080
SUGGESTED RETAIL PRICE: $29.95

ELECTRIC DUET—Synthesize with two voices and a five-octave range.
HARDWARE REQUIREMENTS: Apple II/II plus/IIe/III w/emulator, 32K (disk); DOS 3.3
MANUFACTURER: Insoft, 7933 S.W. Cirrus Dr., Beaverton, OR 97005; (503) 641-5223
SUGGESTED RETAIL PRICE: $29.95

FORTÉ—Compose and change music with the program's writing, editing, and debugging modes. Listen to music through a monitor speaker, or through a stereo system via the cassette port.
HARDWARE REQUIREMENTS: Apple II/II plus/IIe, 48K (disk)
MANUFACTURER: ARTSCI Inc., 5547 Satsuma Ave., North Hollywood, CA 91601; (213) 985-5763
SUGGESTED RETAIL PRICE: $29.95

FUN WITH MUSIC—Compose and play melodies. Enter your favorite tunes into the computer or compose your own. Learn to read and compose music. Add or remove notes and change the tempo. The program can also turn into a musical-chase game.
HARDWARE REQUIREMENTS: Commodore VIC-20, 8K (cassette)
MANUFACTURER: Epyx, 1043 Kiel Ct., Sunnyvale, CA 94089; (408) 745-0700
SUGGESTED RETAIL PRICE: $39.95

KEYBOARD ORGAN—Play songs, change sounds, →



Type Design and Lettering: William Kefauver

Photo: Rick Browne

Meet the creator of the most-talked-about music software around.

Interview by James Delson

Will Harvey's just your average American kid. Well, almost: clean-cut, nice guy, plays football, toys with model trains. But he's also president of his high school student body and a two-time winner of the San Francisco Science Fair. Not to mention that he's written four computer programs, including *Music Construction Set*. I met Will at the headquarters of Electronic Arts, the software company that is distributing his program.

K-POWER: How did you come up with the idea of doing *Music Construction Set*?

WILL HARVEY: I wrote a game called *Lancaster* and wanted to put music in it, but I didn't know anything about writing music. I had to make something that would translate music from me to the machine. I'd just have to pick up a joystick and move notes around.

KP: What makes this program so special?

WH: It's unique because it's interactive, so you can use the computer as a tool to teach yourself. It's not instructing you. It just provides the environment to learn. This doesn't exist anywhere else.

KP: When did you get your first computer?

WH: Five or six years ago. It was a Commodore PET, though I didn't care what kind I got. I just wanted a computer—it seemed to be the "in" thing. Once I started, I thought, "Well, this is fun," and quickly moved to an Apple. I haven't advanced beyond that, but I've spread out to several different machines: a Commodore 64 and an Atari 800, with an IBM PC coming.

KP: You took to it right away?

WH: It was a long learning process, but I learn quickly. And since computers are ideal self-teaching tools, it really worked well with me.

KP: What was the first program you wrote?

WH: It was for math class, a program that allowed you to play a game called The Whythoff Game. You have two players and two piles of counters. I figured out the mathematics of the game and wrote a program to have the computer play it.

KP: How did you follow that?

WH: The next one was a grading program for my mother, who's a teacher. She needed something to put her grades into "Standard Scores," a statistical process of curving. She had done it by calculator, but that took ages. I called it *Grade Base Manager*.

KP: Are you thinking of majoring in computer science when you go to college next fall?

WH: Probably not. I do computers because I'm having fun. I'm not eager to get any further into them. I want to learn about other things.

KP: Are you a computer games player?

WH: Not often. There's a ways to go before everybody starts using them. When I play computer games, my primary purpose is to see what everybody else is doing, how good the programmers are getting with graphics and so forth.

KP: Are you addicted to computers?

WH: I've gone through many nights from after school till the next morning, but addiction is something I always keep in the back of my mind. I don't believe I'm addicted. In fact, I'm making sure of that right now by putting the computer away. I just finished the Commodore version of *Music Construction Set* and I'm putting the computer into my closet for at least a week to see if I have withdrawal symptoms. If I do, I'm addicted and it's time I did something about it. □

JAMES DELSON *writes about computer games and movies from his home base in New York City.*

MORE MUSIC SOFTWARE

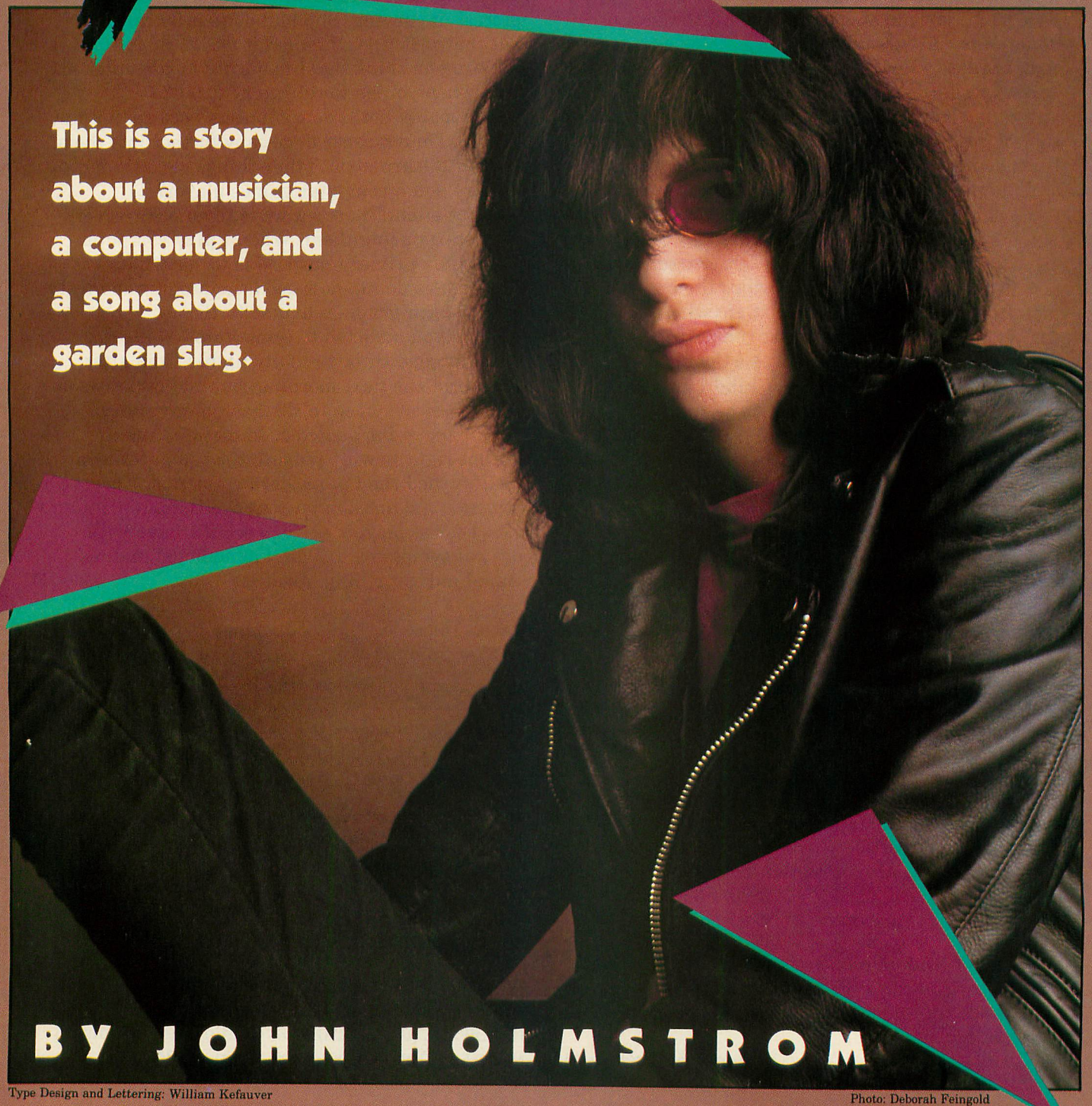
record songs, play back songs, and store music. Turns computer keyboard into an organ keyboard.
HARDWARE REQUIREMENTS: Atari 400/800/1200XL, 24K (disk or cassette)
MANUFACTURER: Atari Program Exchange, P.O. Box 3705, Santa Clara, CA 95055; (800) 538-1862
SUGGESTED RETAIL PRICE: $24.95

MOCKINGBOARD—Produce sound effects, synthetic music, etc. You can even produce synthesized speech.
HARDWARE REQUIREMENTS: Apple II/II plus/IIe, 48K (disk); speakers
MANUFACTURER: Sweet-Micro Systems, 50 Freeway Dr., Cranston, RI 02910; (401) 461-0530
SUGGESTED RETAIL PRICE: $124.95 ($99 if purchased with *Music Construction Set*)

MULTI-SOUND SYNTHESIZER—Compose your own music. The program has four different types of memory.
HARDWARE REQUIREMENTS: VIC-20, 5K (cassette)
MANUFACTURER: Broderbund, 17 Paul Dr., San Rafael, CA 94903; (415) 479-1170
SUGGESTED RETAIL PRICE: $19.95

MUSICALC—Synthesize and sequence some of your favorite songs or develop your own chords.
HARDWARE REQUIREMENTS: Commodore 64 (disk)
MANUFACTURER: Waveform Corp., 1912 Bo- →

PROGRAM ALONG WITH JOEY RAMONE



This is a story about a musician, a computer, and a song about a garden slug.

BY JOHN HOLMSTROM

Type Design and Lettering: William Kefauver

Photo: Deborah Feingold

Leaving no stone unturned and sparing no expense, K-POWER searched for a rock-and-roll song that you could program into your computer. After months of listening to thousands of records and tapes and going to hundreds of live concerts, we found a song we think you're really gonna like. It's called "Slug" and it's written by Joey Ramone. "Slug" has nothing to do with computers, really. (And neither does Joey Ramone . . . usually! But after this experience, he made us pay him in computer equipment instead of money.)

Joey is the lead singer of the famous rock-and-roll group, the Ramones. Formed in 1974, the Ramones have released nine albums and countless singles, most selling in the hundreds of thousands. They're best known for their starring roles in the classic cult comedy film, "Rock 'n Roll High School," directed by Alan Arkush. The Ramones are currently in the studio recording a new album for Warner Brothers.

Joey is the kind of guy who likes to keep busy. He's done a lot of things on his own. He teamed up with Holly Beth Vincent to remake "I Got You Babe." He also recorded several songs with the well-known Doo-Wop group The Mystics (including the classic "Duke of Earl"). And he's had several magazine articles and cartoons published.

Now, Joey has written "Slug" for K-POWER. "Slug" is about how a teenage boy's love for a teenage girl is destroyed by a common garden snail.

In his spare time, Joey likes to watch MTV, play video games, and eat pizza. His favorite rock groups include Def Leppard, Van Halen, T.Rex, the Rattlers, and Shrapnel. Joey is often seen at rock 'n roll clubs in New York City, where he grew up and still lives. Although he's a "rock star," he remains true to his roots, and doesn't act like a big shot. He's as normal as anyone you hang out with.

Of course, this doesn't explain where songs like "I Wanna Be Sedated" or "Slug" come from. All Joey would tell us about that is—"It's a sickness." He did talk a little bit more about "Slug," though. "It's a melodramatic, bittersweet love song. I think the whole family can enjoy it. It reminds me of Michael Jackson's 'Billy Jean '.

Although Joey needs a computer, a robot, and a spare room to keep track of the thousands of cassette tapes and records that litter his apartment, he has a few reservations about the computer revolution. "I think it's interesting and exciting—I just hate to see it get out of hand. I like the basic things. I can appreciate computers, but I'd like to see kids take chances. Kids are so conservative today. I think the computer age is a big part of it. Computers can become too much like a crutch. I think kids need to experience more stuff that's real."

We're not promising you anything, but maybe after you feed "Slug" into your computer, you'll both experience that something. □

JOHN HOLMSTROM *is* K-POWER*'s associate editor. He's best pals with Joey Ramone, who John met when he was editor of* Punk *magazine in the mid-'70s.*

MORE MUSIC SOFTWARE

nita Way, Berkeley, CA 94704; (415) 841-9866
SUGGESTED RETAIL PRICE: $74.95

MUSICAL COMPUTER—A MUSIC TUTOR—Learn the fundamentals of musical notation. The 10-chapter course includes lectures and review tests and can be completed in one hour.
HARDWARE REQUIREMENTS: Atari 400/800/1200XL, 40K (disk)
MANUFACTURER: Atari Program Exchange, P.O. Box 3705, Santa Clara, CA 95055; (800) 538-1862
SUGGESTED RETAIL PRICE: $17.95

MUSIC COMPOSER—Create and play music with this program. Notes are displayed on the screen and played through the speaker on your TV monitor.
HARDWARE REQUIREMENTS: Atari 400/800/1200XL, 8K (cartridge)
MANUFACTURER: Atari, 1312 Crossman Dr., P.O. Box 61657, Sunnyvale, CA 94086; (800) 538-8543
SUGGESTED RETAIL PRICE: $39.95

MUSIC CONSTRUCTION SET—Compose tunes on your computer. The program has music, ranging from rock to ragtime, that can be rewritten and played back.
HARDWARE REQUIREMENTS: Apple II/II plus/IIe, 48K (disk); Commodore 64 (disk); Atari versions planned
MANUFACTURER: Electronic Arts, 2755 Campus Dr., San Mateo, CA 94403; (415) 571-7171
SUGGESTED RETAIL PRICE: $40

ORCHESTRA 90—Compose music with a six-octave range, five voices, and five timbre settings. Hook up to stereo with add-on interface board.
HARDWARE REQUIREMENTS: TRS-80 Models III/4, 16K (disk or cassette)
MANUFACTURER: Software Affair, 858 Rubis Dr., Sunnyvale, CA 94087; (408) 730-1030
SUGGESTED RETAIL PRICE: $79.95

SONGWRITER—Learn how to compose your own music without knowing a single note.
HARDWARE REQUIREMENTS: Apple II w/language card/Apple II plus/IIe/III w/emulator, 48K (disk); Atari 800/1200XL, 48K (disk); Commodore 64; IBM PC (disk)
MANUFACTURER: Scarborough Systems, Inc., 25 N. Broadway, Tarrytown, NY 10591;(914) 332-4545 →

Lyin' in bed one summer's night . . . Everything was a-al-right . . . Something started crawlin' on me . . . S - L - U - G A why why why . . . I saw her walking in the woods last night . . . An' I

APPLE/SLUG

II plus or IIe • 32K RAM

```
10 DIM TN(5,150),TL(5,150),W$(5,150),TV(8),VN(13),VL(5
)
20 FOR X = 0 TO 62:READ A:POKE 768 + X,A:NEXT X
30 FOR X = 1 TO 13:READ VN(X):NEXT X
40 FOR X = 1 TO 8:READ TV(X):NEXT X
50 POKE 32,0:POKE 33,40:POKE 34,0:POKE 35,24
60 HOME:PRINT "          JOEY RAMONE'S SLUG"
70 PRINT:PRINT:FOR X = 1 TO 41:PRINT "S";:NEXT X
80 FOR X = 1 TO 14:HTAB 40:PRINT "SS";:NEXT X
90 FOR X = 1 TO 39:PRINT "S";:NEXT X
100 VTAB 22:HTAB 16:N$ = CHR$(92):PRINT "/";N$;"/";N$;
"/";N$;"/-@"
110 POKE 32,5:POKE 33,32:POKE 34,5:POKE 35,17:VTAB 6
120 FOR X = 1 TO 5:PRINT "TUNING UP";
130 READ VS$,WL$,TT$,ND$:VS$ = VS$ + " "
140 FOR Y = 1 TO LEN(ND$):PRINT ".";
150 TN(X,Y) = TV(ASC(MID$(TT$,Y,1)) - 64):TL(X,Y) = (A
SC(MID$(ND$,Y,1)) - 48) * 31
160 SL = ASC(MID$(WL$,Y,1)) - 48:W$(X,Y) = ""
170 FOR Z = 1 TO SL
180 C = ASC(MID$(VS$,Z,1)):IF C = 42 THEN C = 13
190 W$(X,Y) = W$(X,Y) + CHR$(C):NEXT Z
200 VS$ = RIGHT$(VS$, LEN(VS$) - SL)
210 NEXT Y:VL(X) = LEN(ND$):NEXT X:HOME
220 FOR W = 1 TO 14:IF W = 14 THEN W = 13
230 V = VN(W):FOR X = 1 TO VL(V)
240 POKE 6,TL(V,X):POKE 8,TN(V,X):PRINT W$(V,X);:CALL
768
250 NEXT X:NEXT W
260 END
1000 DATA 165,8,208,13,166,6,169,15,32,168,252,202,208
1010 DATA 248,76,208,245,74,133,9,164,8,173,48,192,136
,234,234,208,251,165,7,56,229,9,133
1020 DATA 7,176,237,198,6,208,233,160,39,185,208,6,170
,185
1030 DATA 207,6,153,208,6,136,208,247,138,153,208,6,96
1040 DATA 1,2,3,2,3,4,1,2,3,2,2,4,5
1050 DATA 62,55,48,46,36,74,65,0
1060 DATA *Lyin' in bed one*Summer's night*Everything*
Was a-alright*Something started*Crawlin' on me*S...L..
.U...G...*
1070 DATA 34344366236422646444533134135
1080 DATA AABAAACBCBAABCBABABABCBCBABCB
1090 DATA 11222224224112422221124224224
1100 DATA *A why why why...*I saw her walking in the*W
oods last night*An' I knew somethin'*Wasn't right*S...
L...U...G...*
1110 DATA 12447244443465231424146342211444 1
1120 DATA HCBCBAAFAAAFAABAHAFAHAFACBCBAAFAAH
1130 DATA 82222211111122222111111222112111 11
1140 DATA *A no no no no*Why'd she have to*Go-o oh-oh.
..*
1150 DATA 123332164533236
1160 DATA HFAAFAHGGGGGGAB
1170 DATA 122222211312222
1180 DATA *And I know that if I*Had her back today*Yes
 I know (I know)*I know (I know)*Why is it always this
 way?*
1190 DATA 142553244522115253512535143212455
1200 DATA HGGCBAGAAGBAFHAFAEEHFAEEHBBCHDBCB
1210 DATA 42222222222222112114121142222 1124
1220 DATA *S...L...U...G...*
1230 DATA 234135,CBABCB,224224
```

ATARI/SLUG

400 or 800 • 32K RAM • color TV or monitor optional

```
10 POKE 106,PEEK(106)-4:GRAPHICS 0:FLAG=1
20 DIM A$(42),F$(50),V(3),BORDER$(40),BR$(5),SLUG$(40)
,SL$(7),TIM(15),IST$(10)
30 PRINT CHR$(125):POKE 752,1:SETCOLOR 1,0,0:SETCOLOR
2,12,6:SETCOLOR 4,5,0
40 BR$="SLUG*":FOR X=0 TO 4:BR$(X+1,X+1)=CHR$(ASC(BR$(
X+1,X+1))+128):NEXT X
50 FOR X=0 TO 35 STEP 5:BORDER$(X+1,X+5)=BR$:NEXT X
60 FOR X=2 TO 37:POSITION X,1:PRINT BORDER$(X-1,X-1);:
POSITION 39-X,21:PRINT BORDER$(X-1,X-1);:NEXT X
70 FOR Y=2 TO 20:POSITION 2,Y:PRINT BORDER$(22-Y,22-Y)
;:POSITION 37,Y:PRINT BORDER$(Y,Y);:NEXT Y
80 POSITION 14,0:PRINT "TUNING UP..."
90 RESTORE 5000:FOR X=1 TO 15:READ A:TIM(X)=A:NEXT X:P
OKE 82,4
100 RESTORE 6000:FOR X=1 TO 10:READ A:IST$(X,X)=CHR$(A
):NEXT X
110 SL$="%]@@@@:":SLUG$=" ":SLUG$(37)=SLUG$:SLUG$(2)=S
LUG$
120 SLUG$(1,7)=SL$:SLUG$(14,21)=SL$:SLUG$(28,34)=SL$
130 RESTORE 3000:FOR X=1536 TO 1768:READ A:POKE X,A:NE
XT X
140 V(0)=(PEEK(106)+1)*256:V(1)=V(0)+197:V(2)=V(1)+93:
V(3)=V(2)+93
150 FOR X=0 TO 3:HI=INT(V(X)/256):LO=V(X)-(HI*256)
160 POKE 1753+X*2,LO:POKE 1761+X*2,LO
170 POKE 1754+X*2,HI:POKE 1762+X*2,HI:NEXT X
180 RESTORE 4000:FOR X=1 TO 42:READ A:A$(X,X)=CHR$(A):
NEXT X
190 RESTORE 2000:C=0:FOR X=1 TO 17:READ F$:FOR Y=1 TO
LEN(F$)
200 Z=ASC(F$(Y,Y))-48:POKE V(0)+C,ASC(A$(Z,Z)):C=C+1
210 NEXT Y:NEXT X
220 SOUND 0,0,10,10:SOUND 1,0,10,10:SOUND 2,0,10,10:SO
UND 3,0,10,10
230 A=USR(ADR(IST$))
240 C=1:RESTORE 1000:TIME=50:POSITION 4,3
250 L=TIM(C):READ F$
260 POSITION 4,C+2:PRINT F$
270 SL$=SLUG$(1):SLUG$(1)=SLUG$(2):SLUG$(37)=SL$
280 POSITION 1,0:PRINT SLUG$(1,37);:POSITION 1,22:PRIN
T SLUG$(1,37);
290 L=L-1:IF L>0 THEN 270
300 C=C+1:IF C=16 THEN 320
310 GOTO 250
320 READ F$:PRINT CHR$(125):POSITION 13,10:PRINT F$:PO
KE 88,PEEK(88)+120:POSITION 0,23:STOP
1000 DATA Ly'in in bed one sum-mer's night
1010 DATA Ev ry thing,wa-as all right
1020 DATA Some thing star ted
1030 DATA craw lin on me  S. L. U. G.
1040 DATA Why why I saw her walk ing,in the woods last
 ni ight
1050 DATA And I knew some thin',was n't ri i i
1060 DATA -ight S L U G Ah no no no no
1070 DATA Why'd she have to Go oh oh oh
```

knew somethin' wasn't right . . . S - L - U - G A No No No No Why'd she have to go-o
Oh Oh . . . I saw her walkin' in the woods last night . . . And I knew somethin' wasn't right . . .

```
1080 DATA And I knew that if I
1090 DATA Had her back to day ay  -yes
1100 DATA I know (I know) I know (I know)
1110 DATA Why is it always this way?
1120 DATA S - L - U - G
2000 DATA 3=K7K7J;K;J;K7H;JEH;J;KAK7J7H;
2010 DATA JA25JMH;J;2NK;K707K7K7K707K;K;
2020 DATA J;K;1;K707K7K;O7K;H;J;H7J7K;K7
2030 DATA O7K7K;O7K;K;O;K;1;L7L7L=L7L;L;
2040 DATA K;J;2G1AL;L;H;J;K;L;K;K;L;J7K;
2050 DATA O=17K;O7K71IO7K71PJ;J;H;F7J7H;
2060 DATA JA681;K707K7K71RZ4<H;H7H7K;K7K
2070 DATA 7F;F7F7J;J7J783D793H793K793F79
2080 DATA 3D793C793B72:1;?7?71I?7?71AD71
2090 DATA U49?M?;@;B;D;FIB;DMZ4<K;K7K70;
2100 DATA O7O7S;S7S7Q;Q7Q783L793K7930793
2110 DATA S793Q793H793K72:1;B7B71IB7B71A
2120 DATA @71U49?MH;J;K;L;OIK;LMZ4>T7T7T
2130 DATA 7T7V7V7V7V7X7X7X7X7W7W7W7W783W
2140 DATA 793T793V793X793W793Y793V793X72
2150 DATA 4W71U93T763X763W793T763X763W79
2160 DATA 3T763X763W793T763X763W7Z
3000 DATA 72,8,152,72,138,72,162,3,188
3010 DATA 197,6,185,217,6,133,203,185,218
3020 DATA 6,133,204,189,201,6,201,5,208
3030 DATA 8,169,0,153,0,210,76,166,6
3040 DATA 201,0,208,126,189,209,6,221,213
3050 DATA 6,208,18,222,205,6,189,205,6
3060 DATA 201,0,240,35,169,0,157,209,6
3070 DATA 76,40,6,188,209,6,177,203,72
3080 DATA 200,177,203,157,201,6,200,152,157
3090 DATA 209,6,188,197,6,104,153,0,210
3100 DATA 76,166,6,188,209,6,177,203,201
3110 DATA 255,240,30,157,205,6,200,177,203
3120 DATA 157,213,6,200,152,24,101,203,133
3130 DATA 203,169,0,101,204,133,204,169,0
3140 DATA 157,209,6,76,40,6,188,197,6
3150 DATA 185,225,6,153,217,6,185,226,6
3160 DATA 153,218,6,169,0,157,201,6,157
3170 DATA 209,6,157,213,6,169,1,157,205
3180 DATA 6,76,8,6,188,197,6,165,203
3190 DATA 153,217,6,165,204,153,218,6,222
3200 DATA 201,6,202,48,3,76,8,6,104
3210 DATA 170,104,168,40,104,76,98,228,0
3220 DATA 2,4,6,0,0,0,0,1,1
3230 DATA 1,1,0,0,0,0,0,0,0
3240 DATA 0,0,0,0,0,0,0,0,0
3250 DATA 0,0,0,0,0,0,0,0
4000 DATA 0,1,2,4,6,8,10,12,16,18,20,24
4010 DATA 30,32,35,37,40,42,45,47,50
4020 DATA 53,56,57,60,64,72,76,80,82
4030 DATA 85,90,96,100,108,144,150,173
4040 DATA 193,217,230,255
5000 DATA 16,8,8,8,48,8,8,8,8,16,16,16,16,16,16
6000 DATA 104,160,0,162,6,138,32,92,228,96
```

COMMODORE 64/SLUG

Color TV or monitor optional

```
10 PRINT CHR$(147);CHR$(5):POKE 53280,12
20 PRINT "    **** 'SLUG' BY JOEY RAMONE ****":PRINT:P
RINT "TUNING UP ..."
30 ZT=4:TIME$="000000"
40 DIM VRS$(5),NTE(5,50,2),DUR(5,50),FRQ(9),WRD(5,50),
PL(5),PHRASE(16)
50 W1=54276:A1=W1+1:S1=A1+1:L1=54272:H1=L1+1:VOL=54296
:V=53248
60 POKE V+21,0
70 FOR X= L1 TO VOL:POKE X,0:NEXT X
80 POKE A1,10:POKE S1,65:POKE W1,33
90 FOR X= 1 TO 9:READ FRQ(X):NEXT X
100 FOR X=1 TO 16:READ PHRASE(X):NEXT X
110 FOR X=1 TO 5:READ T
120 VRS$(X)=CHR$(13)
130 FOR Y=1 TO T:READ TEMP$:VRS$(X)=VRS$(X)+TEMP$:VRS$
(X)=VRS$(X)+CHR$(13)
140 NEXT Y
150 NEXT X
160 FOR X=1 TO 5:READ PL(X)
170 FOR Y=1 TO PL(X)
180 READ WRD(X,Y)
190 READ T$:T=FRQ(INT((ASC(T$)-64)))
200 NTE(X,Y,1)=INT(T/256):NTE(X,Y,2)=T-(NTE(X,Y,1)*256
)
210 READ DUR(X,Y)
220 NEXT Y
230 NEXT X
240 FOR X=856 TO 832+62:POKE X,0:NEXT X
250 FOR X=832 TO 832+23:READ R1:POKE X,R1:NEXT X
260 POKE 2040,13:REM LOCATION
270 POKE V+39,5:REM COLOR
280 SX=180:SY=95:POKE V,SX:POKE V+1,SY
```

MORE MUSIC SOFTWARE

SUGGESTED RETAIL PRICE: $39.95

SYNTHESOUND 64—Play music with a real-time synthesizer that lets you play the keyboard, as opposed to creating a score and letting the machine play it.
HARDWARE REQUIREMENTS: Commodore 64 (cartridge), VIC-20, 5K (cartridge)
MANUFACTURER: HesWare, 150 N. Hill Dr., Brisbane, CA 94005; (415) 468-4111
SUGGESTED RETAIL PRICE: $34.95

SYNTHY 64—Create music with this program. Set up any voice to sound like a piano, accordion, drum, etc.
HARDWARE REQUIREMENTS: Commodore 64 (datassette or 1541 disk drive)
MANUFACTURER: Abacus Software, P.O. Box 7211, Grand Rapids, MI 49510; (616) 241-5510
SUGGESTED RETAIL PRICE: $29.95 (cassette); $32.95 (disk)

VIC MUSIC COMPOSER—Compose in the three voices of the VIC, using the cursor to enter the notes. Play back music in nine tempos with 12 different scales.
HARDWARE REQUIREMENTS: VIC-20, 5K (cartridge)
MANUFACTURER: Thorn EMI, 1370 Ave. of the Americas, New York, NY 10019; (212) 977-8990
SUGGESTED RETAIL PRICE: $39.95 —BERNADETTE GREY

©1983, Joey Ramone, Music Co.

S - L - U - G A No No No No Why'd she have to go-o Oh Oh . . . And I knew that if I had her back today . . . I know I know, why is it always this way . . . S - L - U - G S - L - U - G

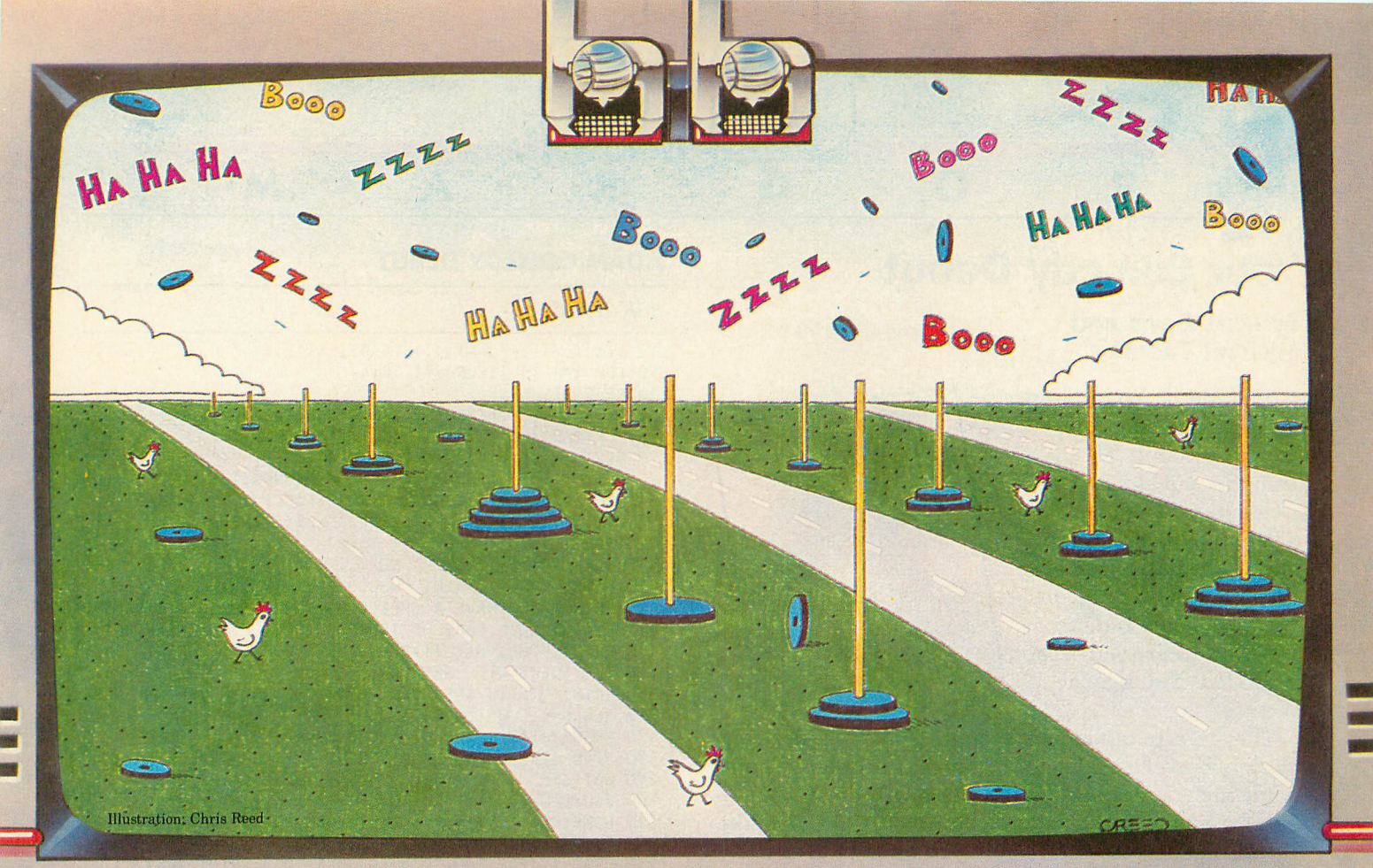
```
290 POKE VOL,12:POKE V+21,1
300 FOR T=1 TO 14
310 IF T=14 THEN T=13:PRINT CHR$(FC+150);:FC=FC+1:IF F
C=5 THEN POKE W1,0:END
320 X=PHRASE(T):SP=1
330 FOR Y=1 TO PL(X)
340 POKE H1,NTE(X,Y,1):POKE L1,NTE(X,Y,2)
350 PRINT MID$(VRS$(X),SP,WRD(X,Y));
360 SP=SP+WRD(X,Y)
370 SX=SX-8:IF SX<25 THEN SX=180:SY=SY+10
380 POKE V,SX:POKE V+1,SY:POKE V+29,-(TI/2=INT(TI/2))
390 DELAY=TI+DUR(X,Y)*ZT
400 IF TI<DELAY THEN 400
410 POKE H1,0:POKE L1,0
420 NEXT Y:NEXT T
1000 DATA 7217,8101,9094,9334,10814,6069,6812,0,12139
1010 DATA 1,2,3,4,5,5,5,5,1,2,3,4,5,5,5,5
1020 DATA 7,LYIN' IN BED ONE,SUMMER'S NIGHT
1030 DATA EVERYTHING,WAS A-ALRIGHT
1040 DATA SOMETHING STARTED,CRAWLIN' ON ME
1050 DATA S..S..L...L..U..G...,6,WHY WHY ...
1060 DATA I SAW HER WALKING IN THE,WOODS LAST NIGHT
1070 DATA AN I KNEW SOMETHIN',WASN'T RIGHT
1080 DATA S...L...U...G...,3
1090 DATA A NO NO NO NO,WHY'D SHE HAVE TO,GO-O OH-OH..
.
1100 DATA 5,AND I KNOW THAT IF I
1110 DATA HAD HER BACK TODAY,YES I KNOW (I KNOW)
1120 DATA I KNOW (I KNOW)
1130 DATA WHY IS IT ALWAYS THIS WAY?
1140 DATA 1,S...L...U...G...
1150 DATA 30,2,A,1,4,A,1,3,B,2,4,A,2,4,A,2,3,A,1,6,C,2
,6,B,5,3,C,2,3,B,2
1160 DATA 6,A,4,4,A,1,2,B,1,2,C,2,6,B,4,4,A,2,6,B,2,4,
A,2,4,B,2,4,A,1
1170 DATA 5,B,1,3,C,2,3,B,4,3,C,3,3,B,2,4,A,4,1,A,1,2,
B,1,3,C,2,5,B,4
1180 DATA 32,1,H,4,4,C,2,7,B,2,2,A,2,4,A,1,4,F,1,4,A,1
,4,A,1
1190 DATA 3,A,1,4,F,1,6,A,2,5,A,2,2,B,2,4,A,2,1,H,2,4,
A,1,2,F,1,4,A,1
1200 DATA 1,H,1,4,A,1,6,F,1,3,A,2,4,C,2,2,B,2,2,C,1,1,
B,1,1,A,2,4,A,1
1210 DATA 4,F,1,4,A,1,4,A,1,1,H,1
1220 DATA 14,3,F,1,3,A,2,3,A,2,3,F,2,2,A,2,0,H,2,6,G,1
,4,G,1,5,G,3
1230 DATA 3,G,1,3,G,2,2,G,2,3,A,2,7,B,2
1240 DATA 32,1,H,4,4,G,2,2,G,2,5,C,2,5,B,2,3,A,2,2,G,2
,4,A,2,4,A,2,5,G,2
1250 DATA 2,B,1,2,A,2,1,F,3,1,H,1,4,A,2,2,F,1,5,A,2,3,
I,1,5,I,1,1,H,3
1260 DATA 2,F,1,5,A,2,3,I,1,5,I,1,1,H,6,4,B,2,3,B,2,2,
C,2,3,D,1
1270 DATA 4,B,1,5,C,2,5,B,4
1280 DATA 6,2,H,2,3,A,1,4,F,1,1,A,1,3,A,1,5,H,10
1290 DATA 0,0,0,128,0,0,65,240,0,191,252,0,63,252,0,31
1300 DATA 255,0,15,255,192,7,249,224,6
```

TRS-80 COLOR COMPUTER/SLUG

16K RAM

```
10 DIM NT(2,109),WD$(25):Y=0
20 FOR J=0 TO 25:READ WD$(J):NEXT J
30 FOR J=0 TO 109:FOR I=1 TO 2
40 READ NT(I,J):NEXT I:NEXT J
50 A$=" '@@@@@:                    "
60 CLS
70 PRINT @ 67,"S L U G - BY JOEY RAMONE";:FOR D=1 TO 1
000:NEXT D
80 FOR J=1 TO 2:FOR I=0 TO 103
90 IF Y=0 AND SUM<200 THEN PRINT:PRINT @ 355,WD$(SUM/8
)
100 PRINT @ 416,A$;
110 A$=RIGHT$(A$,1)+LEFT$(A$,LEN(A$)-1)
120 SUM=SUM+NT(2,I):Y=1
130 IF SUM/8=INT(SUM/8) THEN Y=0
140 IF NT(1,I)>0 THEN SOUND NT(1,I),NT(2,I) ELSE FOR D
E=1 TO -NT(1,I):NEXT DE
150 IF I=74 AND FLAG=0 THEN I=32:FLAG=1:SUM=72
160 NEXT I
170 FLAG=0:SUM=0:Y=0
180 NEXT J
190 FOR I=104 TO 109
200 NN=NT(1,I):D=NT(2,I)
210 PRINT @ 355,WD$(25)
220 A$=RIGHT$(A$,1)+LEFT$(A$,LEN(A$)-1)
230 PRINT @ 416,A$;
240 IF NN>0 THEN SOUND NN,D ELSE FOR DE=1 TO -NN:NEXT
DE
250 NEXT I
260 GOTO 190
1000 DATA LY-IN' IN BED ONE,SUM-MER'S NIGHT
1010 DATA EV-RY-THING,WAS A-AL RIGHT
1020 DATA SOME-THING STARTED,CRAWLIN' ON ME
1030 DATA S .. S .. L ..,L .. U .. G
1040 DATA WHY WHY
1050 DATA I SAW HER WALKING IN THE,WOODS LAST NI-IGHT
1060 DATA AN' I KNEW SOME-THIN',WASN'T RI-I-I-
1070 DATA -IGHT .. S - L - U - G .. AH, NO NO NO NO
1080 DATA WHY'D SHE HAVE TO,GO-O OH OH
1090 DATA AND I,KNEW THAT IF I
1100 DATA HAD HER BACK TO-,DAY-AY ... YES I
1110 DATA KNOW ... I,KNOW
1120 DATA WHY IS IT, ALWAYS THIS WAY?
1130 DATA S-L-U-G
2000 DATA 159,1,159,1,170,2,159,2,159,2
2010 DATA 159,1,180,2,170,5
2020 DATA 180,2,170,2,159,4
2030 DATA 159,1,170,1,180,2,170,4
2040 DATA 159,2,170,2,159,2,170,2
2050 DATA 159,1,170,1,180,2,170,4
2060 DATA 180,2,170,2,159,4
2070 DATA 159,1,170,1,180,2,170,4
2080 DATA -600,4,180,2,170,2
2090 DATA 159,2,159,1,140,1,159,1,159,1,159,1,140,1
2100 DATA 159,2,159,2,170,2,159,2
2110 DATA -100,2,159,1,140,1,159,1,159,2,140,1
2120 DATA 159,2,180,2,170,2,180,1,170,1
2130 DATA 159,2,159,1,140,1,159,1,159,1,-50,1,140,1
2140 DATA 159,2,159,2,140,2,159,2
2150 DATA -100,2,153,1,153,1,153,3,153,1
2160 DATA 153,2,153,2,159,2,170,2
2170 DATA -200,4,153,2,153,2
2180 DATA 180,2,170,2,159,2,153,2
2190 DATA 159,2,159,2,153,3,170,1
2200 DATA 170,2,140,4,159,1,140,1
2210 DATA 159,2,-250,5,140,1
2220 DATA 159,1,-450,7
2230 DATA -100,2,170,2,170,2,180,2
2240 DATA 185,1,170,1,180,2,170,4,-100,2
2250 DATA 159,1,140,1,159,1,159,1,-100,2,-400,8
```


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HACKER HEAVEN

MARCH

PROGRAMS Page 42	PIXEL THAT! Page 46	PUZZLE POWER Page 48
Booo-o, snore, or ha-ha! That could be the audience response to *Your Comedy Debut.*	Here's how to get your C 64 into the graphics mode.	Bet you slip a disk solving *The Towers of Eternity* puzzle.

Illustration: Jim Cherry III

Your Comedy Debut

By Matt Davis and Michael Tuomey

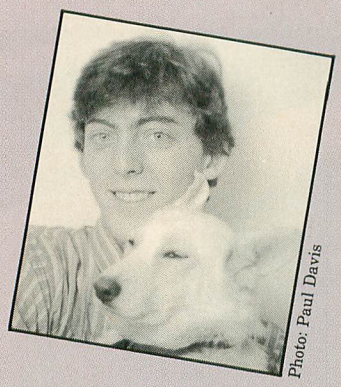


Photo: Paul Davis

You did it! You finally got your first gig as a stand-up comic. The thing is, it's at The Old Comedians' Home outside of town. The *real* Old Comedians' Home outside of town. I mean, these folks are *old.* So old even their teeth are wrinkled. You get the picture: old.

They're a tough crowd, though. Only the most ancient and overused jokes will appeal to them. They want the classics and nothing less will do. No one said being a comic was easy, so if you want to make it in this business you're going to have to give this crowd all you've got.

So, type in *Your Comedy Debut* and just *try* to make 'em laugh!

MATT DAVIS, *16, attends Stuyvesant High School in New York City. He likes movies, comic books, and bad jokes.* MICHAEL TUOMEY, *the assistant editor of* K-POWER, *likes bad jokes, too.*

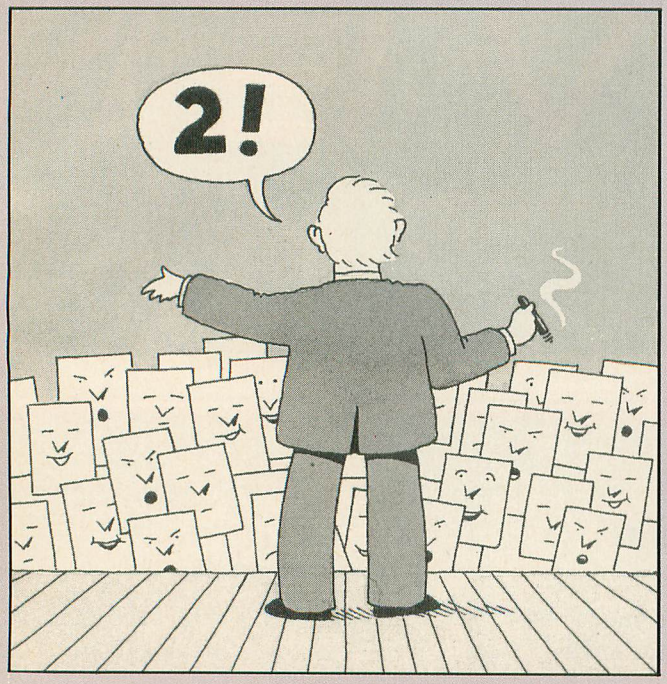


Illustration: Chris Reed

ADAM/COMEDY DEBUT

80K RAM

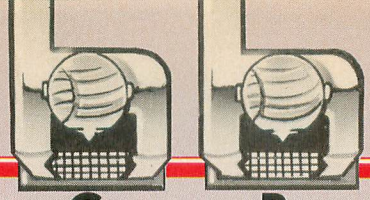
```
10 DIM fc$(5,4),w$(3,3),e$(5),j$(10,6)
40 FOR i=1 TO 4:FOR j=1 TO 4
50 READ al,am,ar
60 fc$(i,j)=" "+CHR$(124)+" "+CHR$(al)+CHR$(am)+CHR$(a
r)+" "+CHR$(124)
70 NEXT j:fc$(5,1)=" "+CHR$(124)+"-----"+CHR$(124)
80 fc$(0,1)=" "+CHR$(124)+"-----"+CHR$(124):READ e$(i)
:NEXT i:READ e$(5):FOR i=1 TO 3:FOR j=1 TO 3:READ q
90 w$(i,j)=CHR$(q):NEXT j:READ sp$(i):NEXT i
100 FOR i=1 TO 10:FOR j=1 TO 6
110 READ j$(i,j):NEXT j:NEXT i
120 HOME:HTAB 11:PRINT "WELCOME":PRINT
130 PRINT "YOU HAVE A CHOICE OF THREE":PRINT "SIDE-SPL
ITTERS FOR EACH PART OF YOUR ROUTINE. PICK THE RIGHT"
140 PRINT "ONE, SAY IT ALOUD (OF COURSE),":PRINT "AND
THE OLD FOLKS WILL SHOW"
150 PRINT "THEIR APPROVAL. PICK THE WRONG":PRINT "ONE
AND, WELL ... WATCH OUT!"
170 PRINT:HTAB 10:PRINT "GOOD LUCK!"
180 HTAB 6:VTAB 23:PRINT "PRESS ANY KEY TO BEGIN ";
190 GET a$
200 s=0:t=0:FOR x=1 TO 10
210 HOME:PRINT j$(x,1):PRINT:FOR y=2 TO 4:n$=STR$(y-1)
+") "+j$(x,y):PRINT n$: PRINT: NEXT y
230 VTAB 17:FOR i=0 TO 5:FOR j=1 TO 3:PRINT fc$(i,1);:
NEXT j:PRINT:NEXT i
240 GOSUB 1000:IF s=3 THEN x=11
250 NEXT x:IF s<>3 THEN 290
260 FOR i=1 TO 40:PRINT:NEXT
270 n$="BEFORE YOU CAN BEGIN YOUR NEXT JOKE YOU ARE BO
MBARDED WITH    ROTTEN TOMATOES. YOU RUN FOR   YOUR LI
FE":PRINT n$:GOTO 440
290 i=INT(t/2)
300 HOME:PRINT "YOUR FINAL JOKE IS GREETED WITH THUNDE
ROUS APPLAUSE, BUT YOU": PRINT "CAN'T TELL IF IT'S FOR
 YOUR"
310 PRINT"BRILLIANT ROUTINE, OR IF":PRINT "THEY'RE JUS
T VERY GLAD YOU'VE": PRINT "FINISHED.":PRINT:PRINT "TH
E NEXT ACT, TINY TINA AND HER"
320 PRINT "BALANCING FOOD, BURSTS ONTO    THE STAGE AN
D HURRIES YOU OFF."
330 PRINT "BACKSTAGE, YOU BUMP INTO ZEUS  'SELTZER BOT
TLE' MCGURK, THE   'FATHER OF VAUDEVILLE', WHO    SAYS
 ...":PRINT n$
380 n$=e$(i):PRINT n$
390 IF i<5 THEN n$="HE THEN SQUIRTS YOU IN THE HEAD WI
TH HIS POCKET-SIZED SELTZER BOTTLE.":PRINT n$:GOTO 440
410 n$="HE THEN OFFERS YOU A TOKEN OF HIS ESTEEM: HIS
LIFE-LONG      COMPANION, A POCKET-SIZED      SELTZER
BOTTLE."
430 n$=n$+"YOU ACCEPT IT   GRACIOUSLY AND, AS EXPECTED
,   SQUIRT HIM IN THE HEAD.":PRINT n$
440 INPUT "TRY AGAIN?";yn$:IF yn$="y" THEN 120
450 HOME:VTAB 20:HTAB 10:PRINT "THE END": FOR i=1 TO 2
000:NEXT:HOME:END
1000 bb=(x/2=INT(x/2))
1010 IF x/5=INT(x/5) OR (x+10)/6=INT((x+10)/6) THEN bb
=bb+1
1020 VTAB 13:FOR i=1 to 31:PRINT CHR$(94);:NEXT:PRINT
1030 GET k$
1040 ON bb*3+VAL(k$) GOTO 1300,1400,1200,1400,1200, 13
00,1200,1300,1400:GOTO 1030
1200 VTAB 18:FOR i=1 TO 5:FOR j=1 TO 3:PRINT fc$(i,2);
:NEXT j:PRINT:NEXT i
```

```
1210 f=1:t=t+1:s=0:GOSUB 2000:RETURN
1300 VTAB 18:FOR i=1 TO 5:FOR j=1 TO 3:PRINT fc$(i,3);
:NEXT j:PRINT:NEXT i
1310 f=2:s=s+1:GOSUB 2000:RETURN
1400 VTAB 18:FOR i=1 TO 5:FOR j=1 TO 3:PRINT fc$(i,4);
:NEXT j:PRINT:NEXT i
1410 f=3:s=s+1:GOSUB 2000:RETURN
2000 VTAB 15:FOR i=3 TO 24 STEP 8:HTAB i:PRINT sp$(f);
:NEXT i
2010 PRINT:FOR i=5 TO 27 STEP 8:HTAB i:PRINT "!";:NEXT
 i
2020 PRINT:FOR n=1 TO 2:FOR i=5 TO 28 STEP 8:VTAB 21
2030 FOR j=1 TO 3:HTAB i:PRINT w$(f,j);:FOR d=1 TO 20:
NEXT d:NEXT j
2040 HTAB i:PRINT w$(f,1);:FOR d=1 TO 40:NEXT d
2050 HTAB i:PRINT w$(f,2);:FOR d=1 TO 20:NEXT d
2060 NEXT i:NEXT n
2070 FOR i=1 TO 400:NEXT i
2080 FOR i=1 TO 24:FOR d=1 TO 20:NEXT d:PRINT:NEXT i
2090 PRINT j$(x,y+(f<>1))
2100 FOR d=1 TO 2500:NEXT d:FOR i=1 TO 12:PRINT:NEXT i
:FOR d=1 TO 1000:NEXT d:FOR i=1 TO 20:PRINT:NEXT i
2120 RETURN
9000 DATA 92,32,95,94,32,94,92,32,47,47,32,92,YOU'RE A
 DISGRACE!
9010 DATA 46,32,46,39,32,39,46,32,46,43,32,43,YOU'RE A
 GOOD KID!
9020 DATA 32,85,32,32,85,32,32,85,32,32,85,32,NOT BAD
FOR A JERK!
9030 DATA 32,45,32,32,79,32,32,94,32,32,46,32,PRETTY G
OOD SON.,BRILLIANT! WE'LL HOLD THE ROOM FOR YOU
9040 DATA 79,61,45,HA-HA,94,45,95,BOO!,46,44,39,SNORE
9050 DATA "YOU OPEN WITH ...","JUST FLEW IN FROM VEGAS
 AND BOY,   ARE MY ARMS TIRED."
9060 DATA "I'D LIKE TO START   WITH A JOKE, BUT I'M AF
RAID YOU'D     LAUGH AT ME."
9070 DATA "GOOD EVENING, LADIES AND     GERMS.'","AAAH
H!THE OLDEST AND THE      FINEST!"
9080 DATA "OUCH!"
9090 DATA "I WASN'T ALWAYS A COMEDIAN ..."
9100 DATA "I USED TO BE IN THE ROADMAP     BUSINESS, B
UT IT FOLDED
9110 DATA "I USED TO WORK IN A COFFEE MILL, BUT I COUL
DN'T STAND THE GRIND."
9120 DATA "I USED TO BE A CANDLEMAKER,    BUT I GOT TI
RED OF WORKING ON  WICK-ENDS."
9130 DATA "LISTEN TO THOSE DATA DENTURES CLICK!","PTOO
EY!"
9140 DATA "Y'KNOW, I USED TO BE SO RICH ... "
9150 DATA "I EVEN HAD A SPECIAL SUIT        JUST FOR T
HE MOTHS."
9160 DATA "I HAD A DENTIST FOR EVERY        TOOTH.","EV
EN MY BUTLER HAD A BUTLER."
9170 DATA "THEY DON'T MAKE JOKES LIKE THAT ANYMORE!","
AAARRGGHH!"
9180 DATA "BOY, MY APARTMENT IS SO          SMALL ...
"
9190 DATA "MY DOG HAS TO WAG HIS TAIL UP  AND DOWN."
9200 DATA "I HAVE TO GO OUTSIDE TO          CHANGE MY
MIND."
9210 DATA "WHENEVER I SNEEZE ... I          REARRANGE
 THE FURNITURE."
9220 DATA "NOW THERE'S A TIME TESTED        FAVORITE!"
9230 DATA "THEY'RE PULLING OUT THE ROTTEN TOMATOES!","
BOY, AM I POOR!"
9240 DATA "MY TIRES ON MY CAR ARE SO        THIN, YOU
 CAN ALMOST SEE THE    AIR."
9250 DATA "MY SHOES ARE SO WORN, I STEP ON A DIME AND
KNOW IF IT'S      HEADS OR TAILS."
9260 DATA "MY CREDIT IS SO BAD, PEOPLE      WON'T EVEN
 ACCEPT MY CASH."
9270 DATA "THE NURSE SAYS YOU'RE            OVER-EXCIT
ING THEM."
9280 DATA "THEY'VE TURNED OFF THEIR         HEARING A
IDS."
9290 DATA "Y'KNOW, I CALL MY","CAR 'RONZONI' BECAUSE I
T    RONZONI IF YOU PUSH IT."
9300 DATA "SOCKS 'GOLF' BECAUSE THEY        HAVE A
HOLE IN ONE."
9310 DATA "DOG 'ARTIC EXPLORER' BECAUSE  HE GOES FROM
POLE TO POLE."
9320 DATA "YOU'RE STRAINING THEIR        PACEMAKERS.",
"YOU CAN DO BETTER THAN THAT."
9330 DATA "Y'KNOW ... "
9340 DATA "MY WIFE. SHE'S SUCH A BAD     COOK OUR GARB
AGE DISPOSAL HAS  AN ULCER."
9350 DATA "BOY, IS SHE FAT, TWO MORE     POUNDS AND SH
E'LL NEED         LICENSE PLATES,"
9360 DATA "TAKE MY WIFE ... PLEASE!","EVEN OLD BUB LAU
GHED AT THAT   ONE!"
9370 DATA "SCOWL! WINCE!"
9380 DATA " ... AND, BOY, IS SHE UGLY!"
9390 DATA "WHEN SHE WAS BORN THE DOCTOR SLAPPED HER MO
THER."
9400 DATA "WHEN SHE WAS BORN THEY BOUGHT  HER A CAGE I
NSTEAD OF A CRIB."
9410 DATA "WHEN SHE WENT TO THE BEACH,          THE TID
E WENT OUT AND NEVER    CAME BACK."
9420 DATA "GROUCHO COULDN'T HAVE DONE     BETTER!","HE
CKLE! HECKLE!"
9430 DATA "I'VE GOT A FRIEND WHO'S SO     DUMB..."
9440 DATA "HE WAS FLATTERED WHEN THE      DOCTOR TOLD
HIM HE HAD ACUTE   APPENDICITIS."
9450 DATA "FORTUNE TELLERS READ HIS       MIND... FOR
HALF PRICE."
9460 DATA "HE WENT ON AN EASTER EGG HUNT  AND SHOT THR
EE EGGS."
9470 DATA "YOU'VE GOT THEM IN THE PALM OF YOUR HAND."
9480 DATA "THE CROWD LOOKS MEAN. YOU START TO SWEAT.",
"Y'KNOW, I CROSSED..."
9490 DATA "A SHEEP WITH A CHOCOLATE BAR   AND GOT A HE
RSHEY BAA."
9500 DATA "A PORCUPINE WITH A GORILLA.    IT ALWAYS GE
TS A SEAT ON THE   SUBWAY."
9510 DATA "PANCAKE MIX WITH MEXICAN       JUMPING BEAN
S AND GOT SELF-    FLIPPING PANCAKES."
9520 DATA "YOU MADE THEM LOSE THEIR       DENTURES WIT
H THAT ONE!"
9530 DATA "A ROTTEN TOMATO HITS YOU IN THE HEAD ...AND
 STICKS THERE."
```

ATARI/COMEDY DEBUT

400 or 800 • 16K RAM

```
10 OPEN #2,4,0,"K:":SETCOLOR 2,12,5:POKE 752,1:POKE 82
,0
20 DIM A$(25),B$(25),C$(25),D$(25),E$(500),J$(2500),J(
11,6),E(6),SP(4),T$(250),HOME$(1),BLNK$(1)
30 DIM Q$(100),W$(100),P$(100),SP$(100)
40 HOME$=CHR$(125):BLNK$=CHR$(32):LD=25
50 PRINT HOME$:PRINT "WELCOME"
60 FOR I=1 TO 4
70 E(I)=LEN(E$)+1
80 READ AL,AM,AR,BL,BM,BR,CL,CM,CR,DL,DM,DR,T$:E$(E(I)
```




```
)=T$
90 A$(I*5-4)=" ":A$(I*5-3)=CHR$(AL):A$(I*5-2)=CHR$(AM)
:A$(I*5-1)=CHR$(AR):A$(I*5)=" "
100 B$(I*5-4)=" ":B$(I*5-3)=CHR$(BL):B$(I*5-2)=CHR$(BM
):B$(I*5-1)=CHR$(BR):B$(I*5)=" "
110 C$(I*5-4)=" ":C$(I*5-3)=CHR$(CL):C$(I*5-2)=CHR$(CM
):C$(I*5-1)=CHR$(CR):C$(I*5)=" "
120 D$(I*5-4)=" ":D$(I*5-3)=CHR$(DL):D$(I*5-2)=CHR$(DM
):D$(I*5-1)=CHR$(DR):D$(I*5)=" "
130 NEXT I
140 T$="     ":A$(21)=T$:B$(21)=T$:C$(21)=T$:D$(21)=T$
:READ T$:E(I)=LEN(E$)+1:E$(E(I))=T$:E(6)=LEN(E$)+1
150 FOR I=1 TO 3:READ Q,W,P,T$
160 SP(I)=LEN(SP$)+1:SP$(SP(I))=T$
170 Q$(I)=CHR$(Q):W$(I)=CHR$(W):P$(I)=CHR$(P)
180 NEXT I:SP(4)=LEN(SP$)+1
190 FOR H=1 TO 10
200 FOR A=1 TO 6
210 J(H,A)=LEN(J$)+1
220 READ T$:J$(J(H,A))=T$
230 NEXT A
240 NEXT H:J(11,1)=LEN(J$)+1
250 T$="YOU HAVE A CHOICE OF THREE SIDE SPLITTERS FOR
EACH PART OF YOUR ROUTINE.":GOSUB 910:PRINT
260 T$="PICK THE RIGHT ONES (SAY THEM ALOUD, OF COURSE
), AND THE OLD FOLKS WILL SHOW":GOSUB 910
270 T$="THEIR APPROVAL. PICK THE WRONG ONES AND,WELL..
.WATCH OUT!!":GOSUB 910
280 PRINT :PRINT "GOOD LUCK !"
290 POSITION 9,17:PRINT "HIT ANY KEY TO BEGIN":GET #2,
K
300 FOR X=1 TO 10
310 PRINT HOME$;:FOR I=1 TO 40:? "*";:NEXT I
320 HEAD=J(X,1):TAIL=J(X,2)-1:PRINT J$(HEAD,TAIL):PRIN
T :FOR Y=2 TO 4:? Y-1;") "
330 HEAD=J(X,Y):TAIL=J(X,Y+1)-1
340 T$=J$(HEAD,TAIL):GOSUB 910:NEXT Y
350 POSITION 0,14:FOR I=1 TO 40:PRINT "*";:NEXT I
360 FOR I=1 TO 36 STEP 6:FOR J=1 TO 5:POSITION I,15+J:
? A$(J*5-4,J*5):NEXT J:NEXT I
370 GOSUB 500
380 IF S=3 THEN X=10
390 NEXT X:IF S=3 THEN 880
400 I=INT(T/2)
410 PRINT HOME$:T$="   YOUR FINAL JOKE IS GREETED WITH
 THUNDEROUS APPLAUSE.  BUT YOU CAN'T TELL IF ITS FOR Y
OUR"
420 T$(LEN(T$)+1)=" BRILLIANT ROUTINE, OR IF THEY'RE J
UST VERY GLAD YOU'RE FINISHED.":GOSUB 910
430 PRINT :T$="   AFTER BEING RUSHED BACKSTAGE BY THE
NEXT ACT, YOU RUN INTO ZEUS 'SELTZER BOTTLE' MCGURK,"
440 T$(LEN(T$)+1)=" 'THE VAUDEVILLE KING,' WHO SAYS :
":GOSUB 910
450 T$=E$(E(I),E(I+1)-1):GOSUB 910:PRINT
460 IF I<5 THEN T$="HE THEN SQUIRTS YOU IN THE HEAD WI
TH A POCKET-SIZED SELTZER BOTTLE.":GOSUB 910:GOTO 490
470 T$="HE THEN GIVES YOU HIS PERSONAL POCKET-SIZED SE
LTZER BOTTLE AS A TOKEN OF HIS ESTEEM.":GOSUB 910
480 PRINT :T$="   YOU ACCEPT IT GRACIOUSLY AND, AS EXP
ECTED, SQUIRT HIM IN THE HEAD":GOSUB 910
490 PRINT :PRINT "THAT'S ALL FOLKS !!!":END
500 BB=(X/2=INT(X/2))
510 IF X/5=INT(X/5) OR (X+10)/6=INT((X+10)/6) THEN BB=
BB+1
520 GET #2,K:K=K-48:IF K<1 OR K>3 THEN 520
530 IF BB=0 THEN ON K GOTO 590,650,560
540 IF BB=1 THEN ON K GOTO 650,560,590
550 IF BB=2 THEN ON K GOTO 560,590,650
560 FOR I=1 TO 36 STEP 6:FOR J=1 TO 5:POSITION I,15+J:
PRINT B$(J*5-4,J*5):NEXT J:NEXT I
570 F=1:T=T+1:S=0:GOSUB 690
580 RETURN
590 FOR I=1 TO 36 STEP 6:FOR J=1 TO 5:POSITION I,15+J:
PRINT C$(J*5-4,J*5):NEXT J:NEXT I
600 S=S+1
610 F=2:GOSUB 690
620 RETURN
630 S=S+1
640 RETURN
650 FOR I=1 TO 36 STEP 6:FOR J=1 TO 5:POSITION I,15+J:
PRINT D$(J*5-4,J*5):NEXT J:NEXT I
660 S=S+1
670 F=3:GOSUB 690
680 RETURN
690 FOR I=1 TO 36 STEP 6:POSITION I,22:PRINT SP$(SP(F)
,SP(F+1)-1);:NEXT I:PRINT " !"
700 FOR N=1 TO 2:FOR I=3 TO 33 STEP 6
710 POSITION I,19:PRINT W$(F,F);:FOR D=1 TO LD:NEXT D
720 POSITION I,19:PRINT P$(F,F);:FOR D=1 TO LD:NEXT D
730 POSITION I,19:PRINT Q$(F,F);:FOR D=1 TO LD:NEXT D
740 POSITION I,19:PRINT W$(F,F);:FOR D=1 TO LD:NEXT D
750 POSITION I,19:PRINT Q$(F,F);:FOR D=1 TO LD:NEXT D
760 NEXT I:NEXT N
770 FOR I=1 TO 200:NEXT I
780 POSITION 7,12:FOR I=1 TO 15:FOR D=1 TO LD:NEXT D:P
RINT CHR$(156);:NEXT I
790 IF F=1 THEN HEAD=J(X,5):TAIL=J(X,6)-1
800 IF F<>1 THEN HEAD=J(X,6):TAIL=J(X+1,1)-1
810 POSITION 0,14:T$=J$(HEAD,TAIL):GOSUB 910
820 IF F<>1 THEN SOUND 0,70,6,6
830 IF F=1 THEN FOR I=150 TO 10 STEP -3:SOUND 0,I,10,6
:NEXT I:SOUND 0,0,0,0
840 FOR I=1 TO 175:NEXT I:SOUND 0,0,0,0
850 RETURN
860 PRINT HOME$:PRINT "   TRY AGAIN ??";:GET #2,K:IF K
<>ASC("Y") THEN END
870 GOTO 900
880 PRINT HOME$:POSITION 0,6:PRINT "BEFORE YOU CAN BEG
IN YOUR NEXT JOKE, YOU ARE BOMBARDED WITH ROTTEN TOMAT
OES."
890 PRINT :PRINT "TRY AGAIN ?";:GET #2,K:IF K<>ASC("Y"
) THEN END
900 PRINT HOME$:POSITION 7,10:? "PRESS ANY KEY TO BEGI
N":GET #2,K:GOTO 300
910 LL=LEN(T$):IF LL<40 THEN PRINT T$:RETURN
920 IF LL>40 THEN LL=39
930 FOR L=1 TO LL:IF ASC(T$(L,L))=32 THEN J=L
940 NEXT L:PRINT T$(1,J):IF J=LEN(T$) THEN RETURN
950 T$=T$(J+1):J=1
960 GOTO 910
9000 DATA 102,32,102,168,32,168,110,32,109,184,32,184,
"YOU'RE A DISGRACE!"
9010 DATA 190,32,188,48,32,48,113,32,113,119,32,119,"W
HOA! WHAT A LOUSY COMIC!"
9020 DATA 32,85,32,32,85,32,32,115,32,32,122,32,"NOT B
AD FOR A JERK!"
9030 DATA 32,175,32,32,119,32,32,113,32,32,119,32
9040 DATA "PRETTY GOOD SON.","WOW! WHAT AN ENTERTAINER
!"
9050 DATA 119,102,119,HA-HA,113,118,113,BOOO!,122,119,
99,SNORE
9060 DATA YOU OPEN WITH ...,"JUST FLEW IN FROM VEGAS A
ND, BOY, ARE MY ARMS TIRED."
9070 DATA" I'D LIKE TO START WITH A JOKE, BUT I'M AFRA
ID YOU'D LAUGH AT ME."
9080 DATA "GOOD EVENING, LADIES AND GERMS!",AAAHH! THE
 OLDEST AND THE FINEST!
9090 DATA OUCH!
```

```
9100 DATA "I WASN'T ALWAYS A COMEDIAN ..."
9110 DATA "I USED TO BE IN THE ROADMAP BUSINESS, BUT I
T FOLDED."
9120 DATA "I USED TO WORK IN A COFFEE MILL BUT I COULD
N'T STAND THE GRIND."
9130 DATA "I USED TO BE A CANDLE-MAKER, BUT I GOT TIRE
D OF WORKING ON WICK-ENDS."
9140 DATA LISTEN TO THOSE DENTURES CLICK!,PTOOEY!
9150 DATA "Y'KNOW, I USED TO BE SO RICH ..."
9160 DATA "I EVEN HAD A SPECIAL SUIT JUST FOR THE MOTH
S."
9170 DATA "I HAD A DENTIST FOR EVERY TOOTH.","EVEN MY
BUTLER HAD A BUTLER."
9180 DATA THEY DON'T MAKE JOKES LIKE THAT ANYMORE!,AAA
RRGGHH!
9190 DATA "BOY, MY APARTMENT IS SO SMALL ..."
9200 DATA "MY DOG HAS TO WAG HIS TAIL UP AND DOWN."
9210 DATA "I HAVE TO GO OUTSIDE TO CHANGE MY MIND."
9220 DATA "WHENEVER I SNEEZE ... I REARRANGE THE FURNI
TURE."
9230 DATA NOW THERE'S A TIME-TESTED FAVORITE!
9240 DATA THEY'RE PULLING OUT THE ROTTEN TOMATOES!,"BO
Y, AM I POOR!"
9250 DATA "THE TIRES ON MY CAR ARE SO THIN, YOU CAN AL
MOST SEE THE AIR."
9260 DATA "MY SHOES ARE SO WORN, WHEN I STEP ON A DIME
 I KNOW IF IT'S HEADS OR TAILS."
9270 DATA "MY CREDIT IS SO BAD, PEOPLE WON'T EVEN ACCE
PT MY CASH."
9280 DATA THE NURSE SAYS YOU'RE OVEREXCITING THEM!
9290 DATA THEY'VE TURNED OFF THEIR HEARING AIDS.
9300 DATA "Y'KNOW, I CALL MY ","CAR 'RONZONI' BECAUSE
IT RONZONI IF YOU PUSH IT."
9310 DATA "SOCKS 'GOLF' BECAUSE THEY HAVE A HOLE IN ON
E."
9320 DATA "DOG 'ARCTIC EXPLORER' BECAUSE HE GOES FROM
POLE TO POLE."
9330 DATA YOU'RE STRAINING THEIR PACEMAKERS.,YOU CAN D
O BETTER THAN THAT!
9340 DATA " "
9350 DATA "I'M NOT SAYING MY WIFE'S A BAD COOK, BUT OU
R GARBAGE DISPOSAL HAS AN ULCER."
9360 DATA "BOY, IS MY WIFE FAT! TWO MORE POUNDS AND SH
E'LL NEED LICENSE PLATES."
9370 DATA "TAKE MY WIFE ... PLEASE!",EVEN OLD BUB LAUG
HED AT THAT ONE!
9380 DATA SCOWL! WINCE!
9390 DATA "... AND BOY, IS SHE UGLY!"
9400 DATA "WHEN SHE WAS BORN, THE DOCTOR SLAPPED HER M
OTHER."
9410 DATA "WHEN SHE WAS BORN, THEY BOUGHT HER A CAGE I
NSTEAD OF A CRIB."
9420 DATA "WHEN SHE WENT TO THE BEACH, THE TIDE WENT O
UT AND NEVER CAME BACK."
9430 DATA GROUCHO COULDN'T HAVE DONE BETTER!,HECKLE! H
ECKLE!
9440 DATA "I'VE GOT A FRIEND WHO'S SO DUMB ..."
9450 DATA "HE WAS FLATTERED WHEN HIS DOCTOR TOLD HIM H
E HAD ACUTE APPENDICITIS."
9460 DATA "FORTUNE-TELLERS READ HIS MIND ... FOR HALF
PRICE."
9470 DATA "HE WENT ON AN EASTER EGG HUNT AND SHOT THRE
E EGGS."
9480 DATA YOU'VE GOT THEM IN THE PALM OF YOUR HAND.
9490 DATA THE CROWD LOOKS MEAN. YOU START TO SWEAT.,"Y
'KNOW, I CROSSED ..."
9500 DATA "A SHEEP WITH A CHOCOLATE BAR AND GOT A HERS
HEY BAA."
9510 DATA "A PORCUPINE WITH A GORILLA. WHATEVER IT IS,
 I CALL IT 'SIR.'"
9520 DATA "PANCAKE MIX WITH MEXICAN JUMPING BEANS AND
GOT SELF-FLIPPING PANCAKES."
9530 DATA YOU MADE THEM LOSE THEIR DENTURES WITH THAT
ONE!
9540 DATA A ROTTEN TOMATO HITS YOU IN THE HEAD ... AND
 STICKS THERE.
```

VIC-20/COMEDY DEBUT

8K RAM cartridge

```
10 DIM FC$(5,4),W$(3,3),E$(5),J$(10,6)
20 HOME$=CHR$(147):ROW=214:COL=211
30 FOR I=1 TO 4:FOR J=1 TO 4
40 READ AL,AM,AR
50 FC$(I,J)=CHR$(182)+" "+CHR$(AL)+CHR$(AM)+CHR$(AR)+"
 "+CHR$(181)
60 NEXT J:FC$(5,I)=CHR$(182)+"     "+CHR$(181):READ E$
(I):NEXT I:READ E$(5)
70 FOR I=1 TO 3:FOR J=1 TO 3:READ Q
80 W$(I,J)=CHR$(Q):NEXT J:READ SP$(I):NEXT I
90 FOR I=1 TO 10:FOR J=1 TO 6
100 READ J$(I,J):NEXT J:NEXT I
110 PRINT HOME$:PRINT CHR$(18);:POKE COL,7:PRINT "WELC
OME":PRINT
120 N$="YOU HAVE A CHOICE OF THREE SIDE-SPLITTERS. "
130 N$=N$+"PICK THE RIGHT ONE, SAY IT ALOUD (OF COURSE
), AND THE OLD FOLKS"
140 N$=N$+" WILL SHOW THEIR APPROVAL. PICK THE WRONG O
NE AND, WELL ... WATCH OUT!"
150 GOSUB 3000
160 PRINT:PRINT CHR$(18);:POKE COL,6:PRINT "GOOD LUCK"
170 PRINT:PRINT "PRESS ANY KEY TO BEGIN"
180 GET A$:IF A$="" THEN 180
190 S=0:T=0:FOR X=1 TO 10
200 PRINT HOME$;:N$=J$(X,1):GOSUB 3000:FOR Y=2 TO 4:N$
=STR$(Y-1)+") "+J$(X,Y)
210 GOSUB 3000:NEXT Y
220 FOR I=1 TO 5:R=I+15:C=0:GOSUB 4000:FOR J=1 TO 3:PR
INT FC$(I,1);:NEXT J:NEXT I
230 GOSUB 1000:IF S=3 THEN X=11
240 NEXT X:IF S=3 THEN FOR I=1 TO 40:PRINT:NEXT I:N$="
BEFORE YOU CAN BEGIN YOUR NEXT"
250 IF S=3 THEN N$=N$+" JOKE, YOU ARE BOMBARDED WITH T
OMATOES. YOU RUN FOR YOUR LIFE."
260 IF S=3 THEN GOSUB 3000:PRINT:GOTO 420
270 FOR I=1 TO 4000:NEXT I:I=INT(T/2)
280 PRINT HOME$:N$="YOUR FINAL JOKE IS GREETED WITH TH
UNDEROUS APPLAUSE."
290 N$=N$+" BUT YOU CAN'T TELL IF IT'S FOR YOUR BRILLI
ANT ROUTINE, "
300 N$=N$+"OR IF THEY'RE JUST VERY GLAD YOU'RE FINISHE
D.":GOSUB 3000
310 FOR J=1 TO 4500:NEXT J:PRINT HOME$
320 N$="THE NEXT ACT, 'TINY TINA AND HER BALANCING FOO
D,' BURSTS ONTO "
330 N$=N$+"THE STAGE AND HURRIES YOU OFF. BACKSTAGE, Y
OU BUMP INTO"
340 N$=N$+" ZEUS 'SELTZER BOTTLE' MCGURK, THE 'FATHER
OF VAUDEVILLE,' WHO SAYS ..."
350 GOSUB 3000
360 PRINT:N$=E$(I):GOSUB 3000:PRINT
370 IF I<5 THEN N$="HE THEN SQUIRTS YOU IN THE HEAD WI
TH HIS POCKET-SIZED "
380 IF I<5 THEN N$=N$+"SELTZER BOTTLE.":GOSUB 3000:GOT
O 420
390 N$="HE THEN OFFERS YOU A TOKEN OF HIS ESTEEM: HIS
```

```
LIFELONG COMPANION,"
400 N$=N$+" A POCKET-SIZED SELTZER BOTTLE. YOU ACCEPT
IT GRACIOUSLY AND,"
410 N$=N$+" AS EXPECTED, SQUIRT HIM IN THE HEAD.":GOSU
B 3000
420 R=22:C=3:GOSUB 4000:INPUT "TRY AGAIN";A$:IF LEFT$(
A$,1)="Y" THEN 110
430 PRINT HOME$:R=10:C=19:PRINT "THE END":END
1000 BB=-(X/2=INT(X/2)):IF X/5=INT(X/5) OR (X+10)/6=IN
T((X+10)/6) THEN BB=BB+1
1010 R=15:C=0:GOSUB 4000:FOR I=1 TO 22:PRINT "*";:NEXT
 I:PRINT
1020 GET K$:I=VAL(K$):IF I<1 OR I>3 THEN 1020
1030 ON BB*3+VAL(K$) GOTO 1060,1080,1040,1080,1040,106
0,1040,1060,1080:GOTO 1020
1040 R=16:C=0:GOSUB 4000:FOR I=1 TO 5:FOR J=1 TO 3:PRI
NT FC$(I,2);:NEXT J:PRINT
1050 F=1:T=T+F:S=0:GOSUB 2000:RETURN
1060 R=16:C=0:GOSUB 4000 :FOR I=1 TO 5:FOR J=1 TO 3:PR
INT FC$(I,3);:NEXT J:PRINT
1070 F=2:S=S+1:GOSUB 2000:RETURN
1080 R=16:C=0:GOSUB 4000:FOR I=1 TO 5:FOR J=1 TO 3:PRI
NT FC$(I,4);:NEXT J:PRINT
1090 F=3:S=S+1:GOSUB 2000:RETURN
2000 R=21:C=0:GOSUB 4000:FOR I=1 TO 15 STEP 7:POKE COL
,I:PRINT SP$(F);"!";:NEXT I
2010 FOR N=1 TO 2:FOR I=3 TO 17 STEP 7:R=19:C=0:GOSUB
4000
2020 FOR J=1 TO 3:POKE COL,I:PRINT W$(F,J);:FOR D=1 TO
 50:NEXT D:NEXT J:NEXT I:NEXT N
2030 FOR I=1 TO 400:NEXT I:FOR I=1 TO 18:FOR D=1 TO 20
:NEXT D:PRINT:NEXT I
2040 N$=J$(X,Y-(F<>1)):GOSUB 3000
2050 FOR D=1 TO 25:NEXT D:FOR I=1 TO 12:PRINT:NEXT I:F
OR D=1 TO 1000:NEXT D
2060 FOR I=1 TO 20:PRINT:NEXT I:RETURN
3000 IF LEN(N$)<22 THEN PRINT N$:RETURN
3010 FOR L=1 TO 21:IF ASC(MID$(N$,L,1))=32 THEN J=L
3020 NEXT L:PRINT LEFT$(N$,J):N$=RIGHT$(N$,LEN(N$)-J):
GOTO 3000
4000 SM=R*22+4096:ZH=INT(SM/256):ZL=SM-ZH*256
4010 POKE 209,ZL:POKE 210,ZH:POKE 214,R:POKE 211,C:RET
URN
```

● Add DATA statements 9000-9540 from Atari listing.

C 64 Line Drawing

by Adam Schussheim

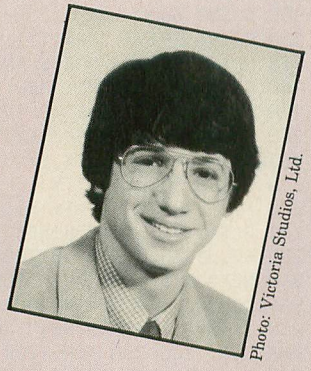


Photo: Victoria Studios, Ltd.

The Commodore 64 comes with an arsenal of features to provide good graphics displays. But the version of BASIC that comes with the 64 doesn't give you graphics commands to access these features. So a programmer is forced to resort to a barrage of PEEKs and POKEs that could give anyone migraine headaches. The good news, though: Using graphics on the 64 isn't *that* hard.

In character mode, the Commodore screen is normally divided into 1,000 blocks. Each block can contain any one of the printable characters. Because various graphics characters are included in the character set, you can draw moderately good pictures. But the high-resolution graphics mode breaks the 1,000 blocks into 64,000 dots. (Each block is divided into 64 dots, an 8- by 8-dot square.) Now you have 64,000 individual dots on the screen that can be turned on or off at your command.

At this point, it helps to understand binary notation because pixels act a lot like binary switches. A location in memory can hold any number from 0 to 255. Each memory location is made up of eight switches. Each switch, like a light switch, can be either on or off. With eight switches that can be on or off, you have 256 different permutations. Each of these combinations is used to represent a specific number. This is done by representing numbers in base 2. Base 2 is the same as base 10 (which we usually work with) except that the only digits are 1 and 0. And each place, instead of representing powers of 10 (1s, 10s, 100s, 1,000s, etc.), represents

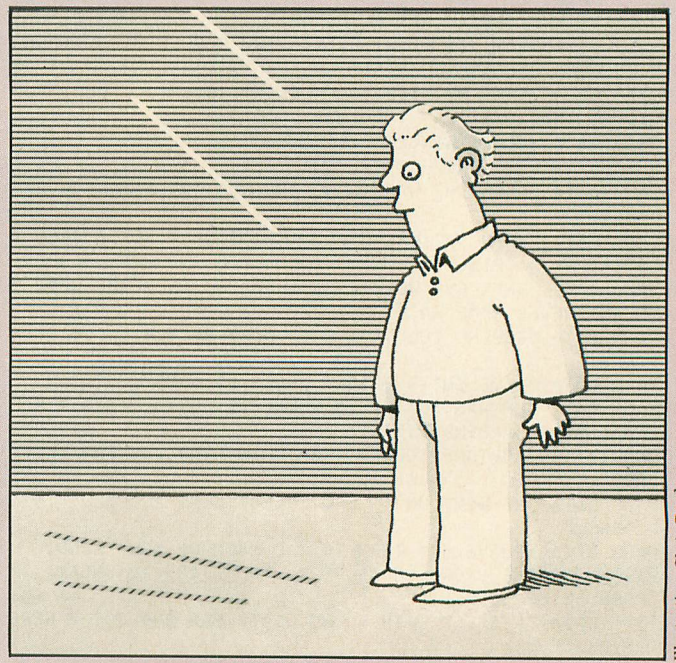


Illustration: Chris Reed

powers of 2 (1s, 2s, 4s, 8s, 16s, etc.). So what would 1001 in base 2 be in base 10? Well, you have one 1, zero 2s, zero 4s, and one 8; 1 plus 8 equals 9. So 1001 in base 2 equals 9 in base 10.

It takes two POKEs to set up graphics mode in your C 64. (POKE puts a specified number into a memory location.) We begin with this:

```
20 POKE 53265,PEEK(53265) OR 32
```

OR is a BASIC command used to "turn on a switch" in a memory location. PEEK(53265) is the value previously stored in memory at that location. ORing it with 32 turns on the fifth switch ($2^5 = 32$) and leaves the rest of the switches unchanged. This new value is put back into memory. This means that when switch five in location 53265 is "on," the 64 goes into graphics mode.

The graphics screen contains 64,000 pixels, and each pixel can be either on or off, just as a switch can. One switch controls one pixel, and there are eight switches in one memory location. So the machine must control 64,000 switches and there must be 8,000 memory locations. But where do we put 8K of memory? Well, since the 64 has 64K of memory, there's plenty of room! We also can choose where in memory we want to put this 8K block by putting a specific value into memory location 53272. The chart of values corresponding to specific locations can be found in the *Programmer's Reference Guide*. Let's just use a consistent location: 8192. To choose this location you must have

```
30 POKE 53272,PEEK(53272) OR 8
```

Set for bit-mapped graphics

Now the computer is set to use bit-mapped graphics (it's called bit mapped because each bit in memory from location 8192 to 16191 controls one pixel on the screen). If you turn on any bit in any of these 8,000 memory locations between 8192 and 16191, a pixel will turn on.

To start our program, clear the 8,000 locations to clear the screen. The line would look like this:

```
40 LO = 8192:FOR K = LO TO LO + 7999:POKE K,0:NEXT K
```

We also want to be able to use color with these graphics. In the 64's standard bit-map mode, any pixel in any square (remember, a square is 8 by 8 dots) can be one of two colors. The programmer can decide which two colors he or she wants for each square. Codes for these colors are stored in normal screen memory (locations 1024 to 2023). Since each memory location is made up of eight switches, if we want to store two values in each location, it's logical to use four switches for each number, storing one value in the top four bits and the other in the bottom four. Sixteen different patterns can be put into four switches, from 0, binary 0000, to 15, 1111. For simplicity's sake, we'll use the same two colors in all boxes. This is how we will program it:

```
50 C1 = 1:C2=0:FOR L = 1024 TO 2023:POKE L,C2*16 + C1:
NEXT L
```

In this program, C1 is equal to the code of the background color, and C2 is the code for the foreground color. The table for the 64's colors and codes can be found in your manual. In this case, dots will be plotted black on a white background.

How the program works

Now you have the computer set for high-resolution graphics. But how do you use them? The key here is practicality. You already know that in order to turn on a dot you must turn on a specific bit. But how do you know which, and how can you do it practically? Here is a subroutine that enables you to set or reset any dot on the screen. The screen is divided like a piece of graph paper. There are 320 dots horizontally and 200 vertically, and any dot can be located using an ordered pair. The point (0,0) is in the upper left corner, while (319,199) is in the lower right.

```
10 REM SIMPLE PROGRAM TO INITIALIZE BIT MAP GRAPHICS W
/SET POINT ROUTINE
20 POKE 53265,PEEK(53265) OR 32
30 POKE 53272,PEEK(53272) OR 8
40 LO = 8192:FOR K = LO TO LO + 7999:POKE K,0:NEXT K
50 C1 = 1:C2=0:FOR L = 1024 TO 2023:POKE L,C2*16 + C1:
NEXT L
60 REM LINE 70 WILL DRAW LINE Y = X FROM 0TO 100
70 FOR X = 0 TO 100:Y = X:GOSUB 110:NEXT X
80 GOTO 80
100 REM SETS POINT (X,Y) ON SCREEN
110 C = INT(X/8)
120 R = INT(Y/8)
130 XR = X - 8*C:YR = Y - 8*R
140 PL = LO + R*320 + 8*C + YR
150 BI = 7 - XR:POKE PL,PEEK(PL) OR 2^BI
160 RETURN
```

To use the subroutine, set the variables X and Y to the coordinates and then GOSUB 100 to set the point. The following is a line-by-line explanation of how the routine works.

110. C is set to the horizontal square in which the point lies. Remember, each square contains eight points, so the integer value of X divided by 8 will be the column number.

120. R is set to the vertical square (row) in which

the point lies. There are eight vertical points in each square.

130. XR and YR are set to the remainder, that is, the number of points into the square the X and Y values are.

140. This line calculates the actual memory address (PL) that stores the value of that one bit and seven others associated with that point. The 8,000 bytes are set up as follows.

FIRST LINE (ROW 0)	BYTE 0	BYTE 8	BYTE 16	BYTE 24	...	BYTE 312
	BYTE 1	BYTE 9	.	.		BYTE 313
	BYTE 2	BYTE 10	.	.		BYTE 314
	BYTE 3	BYTE 11	.	.		BYTE 315
	BYTE 4	BYTE 12	.	.		BYTE 316
	BYTE 5	BYTE 13	.	.		BYTE 317
	BYTE 6	BYTE 14	.	.		BYTE 318
	BYTE 7	BYTE 15	.	.		BYTE 319
SECOND LINE (ROW 1)	BYTE 320	BYTE 328	BYTE 336	BYTE 344	...	BYTE 632
	BYTE 321	BYTE 329	.	.		BYTE 633
	BYTE 322	BYTE 330	.	.		BYTE 634
	BYTE 323	BYTE 331	.	.		BYTE 635
	BYTE 324	BYTE 332	.	.		BYTE 636
	BYTE 325	BYTE 333	.	.		BYTE 637
	BYTE 326	BYTE 334	.	.		BYTE 638
	BYTE 327	BYTE 335	.	.		BYTE 639
	BYTE 640 ...					

Source: Commodore 64 Programmer's Reference Guide, 1982.

So as you can see, PL is calculated as the base address plus 320 times the row number since 320 bytes are used for each row, plus eight times the column number because each column consumes eight bytes, plus the number of extra vertical lines into the box.

150 BI is set to the bit number that has to be set. Then it is set in memory location PL.

Below is a sketching program that utilizes this routine. After typing it in, just run the program. Use the "I," "J," "K," and "M" keys to move the dot. Press the space bar to toggle between setting and erasing.

Now you can set or reset any point on the Commodore 64 graphics screen.

```
10 PRINT CHR$(147)
20 BA = 4096*2
30 FOR K = BA TO BA + 7999:POKE K,0:NEXT K
40 POKE 53265,PEEK(53265) OR 32
50 POKE 53272,PEEK(53272) OR 8
60 FOR K = 1024 TO 2023:POKE K,1 + 0*16:NEXT K
70 X = 150:Y = 150:S = 1
80 IF S = 1 THEN GOSUB 2000:GOTO 100
90 GOSUB 3000
100 GET A$
110 IF A$ = " " THEN S = -S
120 IF A$ = "J" THEN X = X - 1
130 IF A$ = "K" THEN X = X + 1
140 IF A$ = "I" THEN Y = Y - 1
150 IF A$ = "M" THEN Y = Y + 1
160 GOTO 80
1000 C = INT(X/8)
1010 R = INT(Y/8)
1020 XR = X - 8*C:YR = Y - 8*R
1030 BY = BA + R*320 + 8*C + YR
1040 BI = 7 - XR:RETURN
2000 GOSUB 1000:POKE BY,PEEK(BY) OR (2^BI):RETURN
3000 GOSUB 1000:POKE BY,PEEK(BY) AND 255 - (2^BI):RETU
RN
```

ADAM SCHUSSHEIM, *17, lives in Great Neck, New York.*

The Towers of Eternity

By Justin Greene

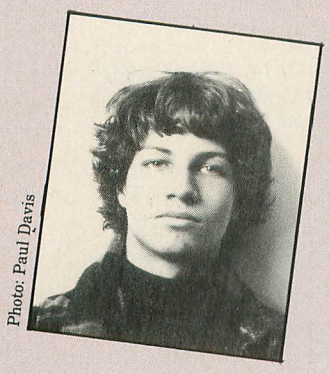


Photo: Paul Davis

The original version of this puzzle, fashioned from wood and clay by monks in the Orient thousands of years ago, has yet to be solved.

This version is a little simpler, and without the wood and clay.

The puzzle designed by the monks had three wooden pegs with 64 clay disks stacked on one of them. Each disk was smaller than the one beneath it. The object was to transfer all the disks, one by one, to one of the other pegs.

There was a catch, though: A disk could be placed only on an empty peg or on a disk larger than itself. Yes, that can really make things complicated. The monks have had their towers sitting around the monastery for a long, long time, and they're not even close to finishing.

I made my puzzle with only nine disks so it won't take quite so long to finish. I also added a routine that will give you the option to watch the puzzle solve itself. (If only I could find those monks. I'm sure they'd be very appreciative.)

JUSTIN GREENE, *16, lives in New York City and runs a mail-order software distributing company in his spare time.*



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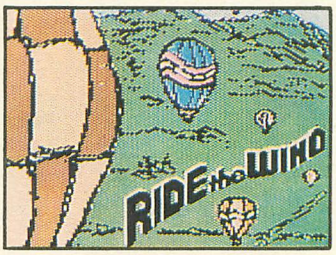
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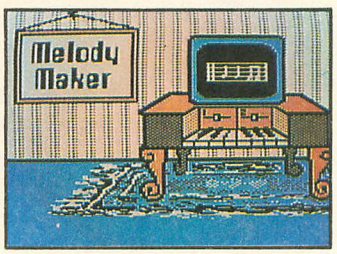
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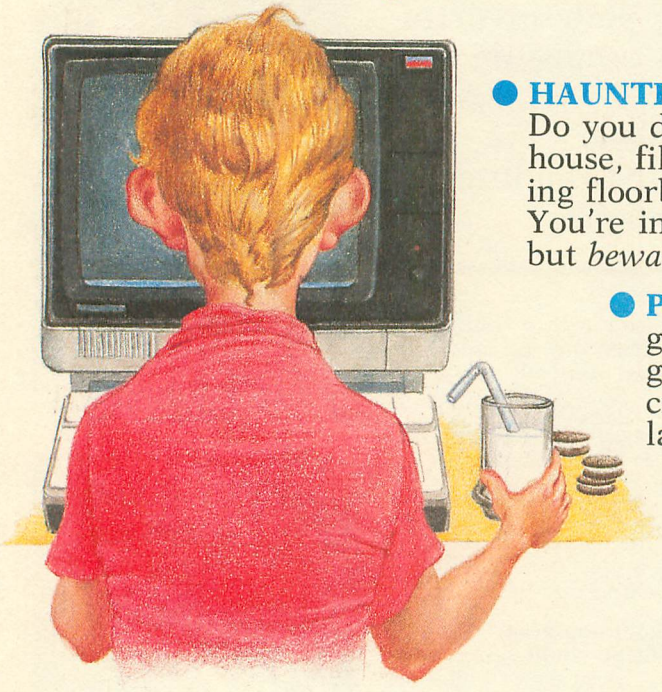
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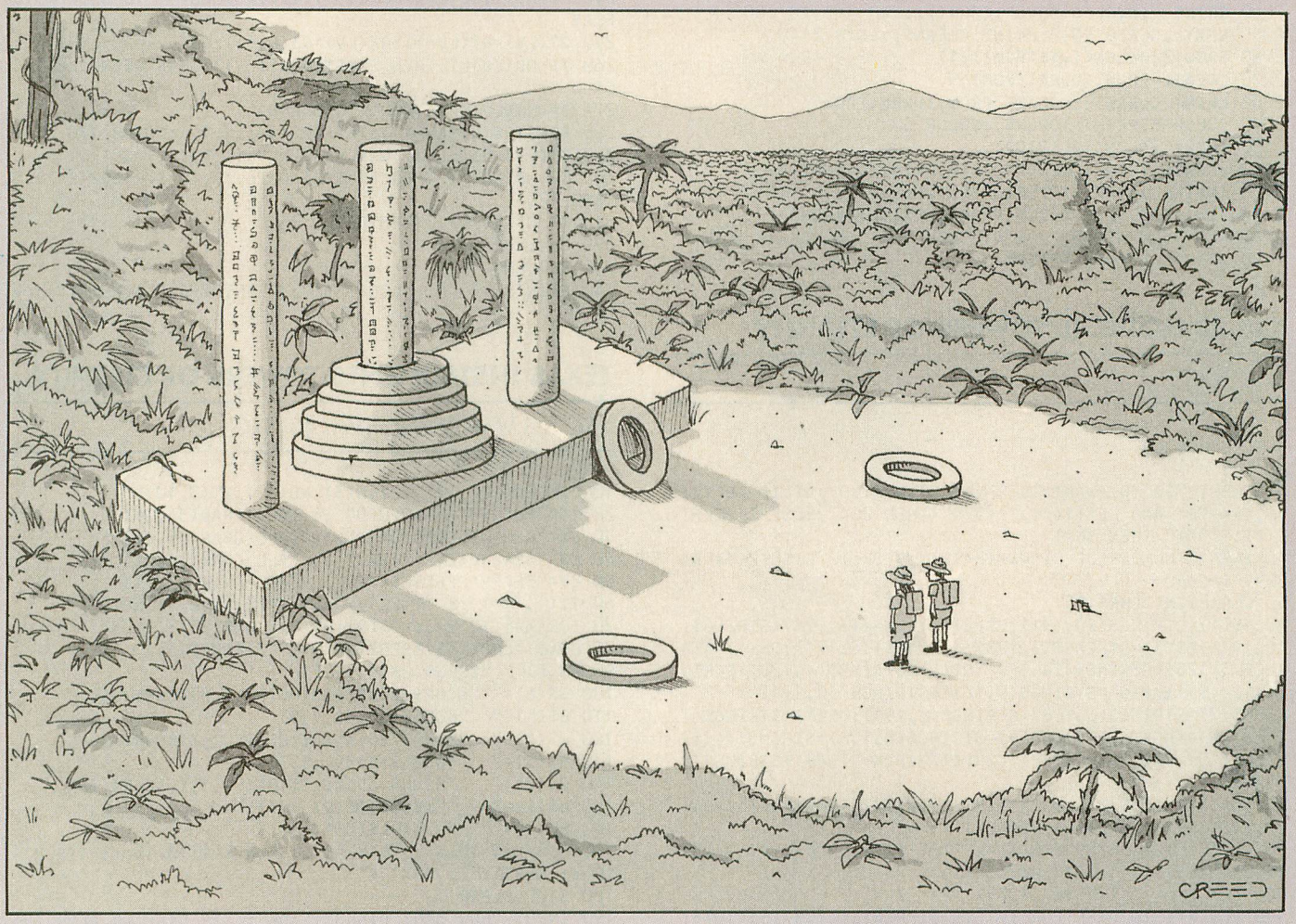
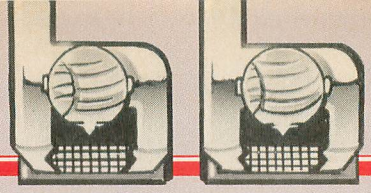


Illustration: Chris Reed

IBM/TOWERS OF ETERNITY

64K RAM • color monitor and Color Graphics Adapter optional

```
10 CLEAR 5000:TOWER(1)=10:TOWER(2)=40:TOWER(3)=71
20 B$=STRING$(80,219):TOWER$=LEFT$(B$,1)
30 P$=STRING$(19,205):P=3:FOR NUMDISK=1 TO 9
40 DISK$(NUMDISK)=LEFT$(P$,P):P=P+2: NEXT
50 CLEAN$=STRING$(19,32)
60 KEY OFF:PRINT" Do you want to P)lay or W)atch ?"
70 A$=INKEY$:IF A$<>"P" AND A$<>"W" THEN 70
80 IF A$="W" THEN SU=1
90 INPUT "How many disks ";DISK:IF DISK<2 OR DISK>9 TH
EN 90
100 TW$(1)="":FOR N=1 TO DISK:TW$(1)=TW$(1)+CHR$(49+DI
SK-N):NEXT N
110 TW$(3)="":Q1(1)=1:Q2(1)=3: Q3(1)=2:CLS
120 CLS:LOCATE 24:COLOR 4:PRINT B$;:COLOR 6
130 FOR I=1 TO 3:FOR ROW=13 TO 22:LOCATE ROW,TOWER(I)
140 PRINT TOWER$:NEXT ROW,I:DROW=23-DISK:COLOR 3
150 FOR NUMDISK=1 TO DISK:LOCATE DROW,TOWER(1)-NUMDISK
160 PRINT DISK$(NUMDISK):DROW=DROW+1:NEXT
170 FOR I=1 TO 3:LOCATE 25,TOWER(I)-5
180 PRINT " TOWER #";I;:NEXT:IF SU THEN GOSUB 1000:GOT
O 250
190 LOCATE 8,2:INPUT "FROM: ";FROM
200 IF FROM<1 OR FROM>3 OR LEN(TW$(FROM))=0 THEN 190
210 LOCATE 8,14:INPUT "TO:";XTO
220 IF XTO<1 OR XTO>3 OR XTO=FROM THEN 210
230 GOSUB 2000
240 IF LEN(TW$(2))<DISK AND LEN(TW$(3))<DISK THEN 190
250 LOCATE 10,3:PRINT "ALL DONE !!!";CHR$(9):END
1000 LV=1:ND(LV)=DISK
1010 LV=LV+1:ND(LV)=ND(LV-1)-1:Q1(LV)=Q1(LV-1)
1020 Q2(LV)=Q3(LV-1):Q3(LV)=Q2(LV-1)
1030 IF ND(LV)<>1 THEN GOSUB 1010:GOTO 1050
1040 FROM=Q1(LV):XTO=Q2(LV):GOSUB 2000
1050 FROM=Q1(LV-1):XTO=Q2(LV-1):GOSUB 2000
1060 Q1(LV)=Q3(LV-1):Q2(LV)=Q2(LV-1):Q3(LV)=Q1(LV-1)
1070 Q3(LV)=Q1(LV-1)
1080 IF ND(LV)<>1 THEN 1100
1090 FROM=Q1(LV):XTO=Q2(LV):GOSUB 2000
1100 IF ND(LV)<>1 THEN GOSUB 1010
1110 LV=LV-1
1120 RETURN
2000 FD=VAL(RIGHT$(TW$(FROM),1))
2010 TD=VAL(RIGHT$(TW$(XTO),1))
2020 IF LEN(TW$(XTO))=0 THEN 2060
2030 IF FD<TD THEN 2060 ELSE LOCATE 10,2
```




```
2040 PRINT "INVALID MOVE";CHR$(7):FOR X=1 TO 500
2050 NEXT:LOCATE 10,2:PRINT CLEAN$;:GOTO 2140
2060 FROW=22-(LEN(TW$(FROM))-1)
2070 LOCATE FROW,TOWER(FROM)-9
2080 PRINT CLEAN$;:LOCATE FROW,TOWER(FROM)
2090 COLOR 6:PRINT TOWER$;:COLOR 3
2100 TROW=22-LEN(TW$(XTO))
2110 LOCATE TROW,TOWER(XTO)-FD:PRINT DISK$(FD);
2120 TW$(XTO)=TW$(XTO)+RIGHT$(TW$(FROM),1)
2130 TW$(FROM)=LEFT$(TW$(FROM),LEN(TW$(FROM))-1)
2140 M=M+1:LOCATE 5,2:PRINT "MOVES = ";M:LOCATE 8,2
2150 PRINT CLEAN$;:RETURN
```

TRS-80 MODEL III/TOWERS OF ETERNITY

16K RAM

```
10 CLEAR 5000
20 CLS
30 INPUT "DO YOU WANT TO P)LAY OR W)ATCH";A$:IF LEFT$(
A$,1)<>"P" AND LEFT$(A$,1)<>"W" THEN 20   ELSE IF LEFT
$(A$,1)="W" THEN SU=1
40 INPUT "NUMBER OF DISKS (2-9) ";DISK:IF DISK<2 OR DI
SK>9 THEN40
50 CLS:PRINT CHR$(15)
60 B$(1)=STRING$(20,191):B$(2)=STRING$(1,128)+STRING$(
18,191):B$(3)=STRING$(2,128)+STRING$(16,191):B$(4)=STR
ING$(3,128)+STRING$(14,191):B$(5)=STRING$(4,128)+STRIN
G$(12,191):B$(6)=STRING$(5,128)+STRING$(10,191)
70 B$(7)=STRING$(6,128)+STRING$(8,191):B$(8)=STRING$(7
,128)+STRING$(6,191):B$(9)=STRING$(8,128)+STRING$(4,19
1):B$(10)=STRING$(9,128)+CHR$(170)+CHR$(149)+STRING$(9
,128)
80 FOR X=1 TO 9:T(1,10-X)=(X+3)*64:T(2,10-X)=(X+3)*64+
21:T(3,10-X)=(X+3)*64+42:NEXT X:M=0
90 T$(1)="123456789":T$(1)=LEFT$(T$(1),DISK):T$(2)="":
T$(3)="":Q1(1)=1:Q2(1)=3:Q3(1)=2
100 FOR X=0 TO 123:SET(X,39):NEXT X
110 FOR X=1 TO DISK:FOR Y=1 TO 3:PRINT@T(Y,X),B$(10);:
NEXT Y:PRINT@T(1,X),B$(X);:NEXT X:IF DISK<=8 THEN FOR
X=DISK+1 TO 9:FOR Y=1 TO 3:PRINT@T(Y,X),B$(10);:NEXT Y
:NEXT X
120 PRINT@902,"TOWER #1";:PRINT@923,"TOWER #2";:PRINT@
944,"TOWER #3";
130 IF SU THEN GOSUB 230  :GOTO 340
140 IF LEN(T$(2))=DISK OR LEN(T$(3))=DISK THEN 220  :E
LSE PRINT@0,"MOVES:";M
150 PRINT@64,"";:INPUT "FROM:";F$:IF VAL(F$)<1 OR VAL(
F$)>3 THEN PRINT@69,STRING$(59,32):GOTO 150  :ELSE IF
LEN(T$(VAL(F$)))=0 THEN 150
160 PRINT@74,"";:INPUT "TO:";T$:IF T$<"1" OR T$>"3" OR
 T$=F$ TEN PRINT@78,STRING$(50,32):GOTO 160
170 IF LEN(T$(VAL(T$)))=0 THEN 190
180 IF RIGHT$(T$(VAL(F$)),1)<RIGHT$(T$(VAL(T$)),1) THE
N PRINT@992,"INVALID MOVE";:FOR X=1 TO 500:NEXT X:PRIN
T@992,STRING$(12,128);:M=M+1:GOTO 140
190 PRINT@T(VAL(F$),LEN(T$(VAL(F$)))),B$(10);:PRINT@T(
VAL(T$),LEN(T$(VAL(T$)))+1),B$(VAL(RIGHT$(T$(VAL(F$)),
1)));:T$(VAL(T$))=T$(VAL(T$))+RIGHT$(T$(VAL(F$)),1):T$
(VAL(F$))=LEFT$(T$(VAL(F$)),LEN(T$(VAL(F$)))-1)
200 M=M+1:PRINT@0,"MOVES: ";M
210 IF SU=1 THEN RETURN ELSE GOTO 140
220 FOR X=1 TO 250:NEXT X:PRINT@190,"CONGRATULATIONS!
YOU HAVE COMPLETED THE GAME IN";M;"MOVES.";:PRINT@896,
CHR$(14):END
230 LV=1:ND(1)=DISK
240 LV=LV+1:ND(LV)=ND(LV-1)-1:FOR DELAY=1 TO 80:NEXT D
ELAY
250 Q1(LV)=Q1(LV-1):Q2(LV)=Q3(LV-1):Q3(LV)=Q2(LV-1)
260 IF ND(LV)=1 THEN F$=STR$(Q1(LV)):T$=STR$(Q2(LV)):G
OSUB 170
270 IF ND(LV)<>1 THEN GOSUB 240
280 F$=STR$(Q1(LV-1)):T$=STR$(Q2(LV-1)):GOSUB 170
290 Q1(LV)=Q3(LV-1):Q2(LV)=Q2(LV-1):Q3(LV)=Q1(LV-1)
300 IF ND(LV)=1 THEN F$=STR$(Q1(LV)):T$=STR$(Q2(LV)):G
OSUB 170
310 IF ND(LV)<>1 THEN GOSUB 240
320 LV=LV-1
330 RETURN
340 PRINT@217,"ALL DONE!!!!";:PRINT@896,"";CHR$(14);:E
ND
```

TEXAS INSTRUMENTS/TOWERS OF ETERNITY

16K RAM • TI Extended BASIC

```
10 DIM B$(10),T(3,10),N(3),ND(10),TT(3,10)
20 I$="FOFOFOFOFOFOFOFO" :: CALL CHAR(34,I$)
30 J$="OFOFOFOFOFOFOFOF" :: CALL CHAR(35,J$)
40 H$="4242424242424242" :: CALL CHAR(36,H$)
50 K$="FFFFFFFFFFFFFFFF" :: CALL CHAR(33,K$)
60 TT(1,1)=1 :: TT(2,1)=3 :: TT(3,1)=2 :: LV=0
70 FOR X=1 TO 9 :: B$(9)=B$(9)&CHR$(33):: NEXT X
80 B$(8)=CHR$(35)&SEG$(B$(9),1,7)&CHR$(34)
90 B$(7)=" "&SEG$(B$(9),1,7)
100 B$(6)=" "&CHR$(35)&SEG$(B$(9),1,5)&CHR$(34)
110 B$(5)="  "&SEG$(B$(9),1,5)
120 B$(4)="  "&CHR$(35)&SEG$(B$(9),1,3)&CHR$(34)
130 B$(3)="   "&SEG$(B$(9),1,3)
140 B$(2)="   "&CHR$(35)&SEG$(B$(9),1,1)&CHR$(34)
150 B$(1)="    "&SEG$(B$(9),1,1)
160 B$(10)="    "&CHR$(36)
170 FOR X=1 TO 3 :: N(X)=0 :: FOR Y=1 TO 10 :: T(X,Y)=
10 :: NEXT Y :: NEXT X
180 CALL CLEAR
190 INPUT "HOW MANY DISKS? ":DK :: IF DK<2 OR DK>9 THE
N 190
200 N(1)=DK :: ND(1)=DK :: FOR X=1 TO DK :: T(1,X)=DK+
1-X :: NEXT X
210 PRINT "DO YOU WANT TO P)LAY"
220 INPUT "            OR W)ATCH? ":A$ :: SU=(A$="W")
230 CALL CLEAR
240 CALL HCHAR(20,1,33,32)
250 FOR Y=1 TO 10 :: FOR X=1 TO 3
260 DISPLAY AT(20-Y,(X-1)*10):B$(T(X,Y))
270 NEXT X :: NEXT Y
280 DISPLAY AT(21,1):"TOWER 1" :: DISPLAY AT(21,10):"T
OWER 2" :: DISPLAY AT(21,1
9):"TOWER 3"
290 IF SU THEN GOSUB 600 ELSE GOSUB 400
300 IF SU THEN T$="" ELSE T$=" CONGRATULATIONS. YOU HA
VE"
310 DISPLAY AT(1,1):T$ :: DISPLAY AT(2,1)BEEP:" COMPLE
TED IN";M;"MOVES."
320 DISPLAY AT(21,1):"      (PRESS SPACE)"
330 CALL KEY(0,A,B):: IF B=0 THEN 330
340 CALL CLEAR :: END
400 DISPLAY AT(23,1):"       " :: DISPLAY AT(22,1):"FR
OM: "
410 CALL KEY(0,F,Q):: IF Q=0 THEN 410
420 A=F-48 :: DISPLAY AT(22,6):A
430 IF A<1 OR A>3 OR N(A)=0 THEN 400
440 DISPLAY AT(23,1):"TO: "
```

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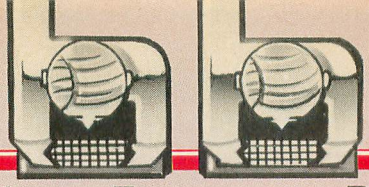
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```
450 CALL KEY(0,Z,Q):: IF Q=0 THEN 450
460 B=Z-48 :: DISPLAY AT(23,6):B
470 IF B<1 OR B>3 OR B=A THEN 440
480 IF N(B)=0 OR T(A,N(A))<T(B,N(B))THEN GOTO 500
490 DISPLAY AT(24,1)SIZE(19)BEEP:"INVALID MOVE!" :: FO
R L=1 TO 500 :: NEXT L ::
DISPLAY AT(24,1)SIZE(28):" " :: GOTO 400
500 GOSUB 700 :: IF N(2)<DK AND N(3)<DK THEN 400
510 RETURN
600 LV=LV+1
610 IF ND(LV)=1 THEN A=TT(1,LV):: B=TT(2,LV):: GOSUB 7
00 :: GOTO 650
620 ND(LV+1)=ND(LV)-1 :: TT(1,LV+1)=TT(1,LV):: TT(2,LV
+1)=TT(3,LV):: TT(3,LV+1)=
TT(2,LV):: GOSUB 600
630 A=TT(1,LV):: B=TT(2,LV):: GOSUB 700
640 ND(LV+1)=ND(LV)-1 :: TT(1,LV+1)=TT(3,LV):: TT(2,LV
+1)=TT(2,LV):: TT(3,LV+1)=
TT(1,LV):: GOSUB 600
650 LV=LV-1
700 X=T(A,N(A)):: N(A)=N(A)-1
710 N(B)=N(B)+1 :: T(B,N(B))=X
720 DISPLAY AT(19-N(A),(A-1)*10)SIZE(10):B$(10)
730 DISPLAY AT(20-N(B),(B-1)*10)SIZE(10):B$(T(B,N(B)))
740 M=M+1 :: DISPLAY AT(1,1):"MOVES: ";M
750 RETURN
```

TIMEX SINCLAIR/TOWERS OF ETERNITY

1000 w/16K RAM Pack or 1500

```
10  FAST
20  DIM D$(10,10)
30  DIM K(3,10)
40  DIM T(3)
50  DIM P(3)
60  DIM S(10)
70  DIM Y(10)
80  DIM N(10)
90  LET M=0
100  FOR F=1 TO 9
110  LET D$(F)="          "
120  FOR G=1 TO F
130  LET D$(F,INT ((10-F)/2)+G)=CHR$ 3
140  LET D$(F,5)=CHR$ 132
150  NEXT G
160  NEXT F
170  FOR F=1 TO 5
180  LET D$(F*2-1,F+5)=CHR$ 1
190  IF F=5 THEN GOTO 210
200  LET D$(F*2,5-F)=CHR$ 2
210  NEXT F
220  LET D$(10)="    "+CHR$ 133+"    "
230  SLOW
240  PRINT AT 0,0;"HOW MANY DISKS?    "
250  INPUT ND
260  PRINT AT 0,16;ND;"    "
270  IF ND>9 OR ND<2 THEN GOTO 240
280  FOR N=1 TO ND
290  LET K(1,N)=ND-N+1
300  NEXT N
310  FOR N=1 TO 3
320  LET T(N)=0
330  LET P(N)=(N-1)*11
340  NEXT N
350  LET T(1)=ND
360  PRINT "1-DO OR 2-WATCH?"
370  INPUT Z
380  CLS
390  FOR N=0 TO 31
400  PRINT AT 20,N;CHR$ 137;
410  NEXT N
420  FOR N=1 TO 10
430  LET P$=D$(10)
440  IF N<=T(1) THEN LET P$=D$(K(1,N))
450  PRINT AT 20-N,P(1);P$;TAB P(2);D$(10);TAB P(3);D
$(10)
460  NEXT N
470  PRINT AT 21,1;"TOWER-1";TAB 12;"TOWER-2";TAB 23;
"TOWER-3"
480  IF Z=1 THEN GOTO 550
490  LET IN=1
500  LET S(IN)=1
510  LET Y(IN)=3
520  LET N(IN)=ND
530  GOSUB 1000
540  STOP
550  PRINT AT 0,0;"MOVES:";M
560  PRINT AT 1,0;"FROM:    "
570  PRINT "        "
580  INPUT O
590  PRINT AT 1,5;O
600  PRINT "TO:";
610  INPUT D
620  PRINT D
630  IF D<1 OR D>3 OR O<1 OR O>3 THEN GOTO 550
640  IF T(O)<1 THEN GOTO 550
650  GOSUB 2000
660  IF T(2)<ND AND T(3)<ND THEN GOTO 550
670  PRINT AT 0,0;"(----------------------------)"
680  PRINT "*  WELL DONE - IN ";M;" MOVES"
690  PRINT AT 1,30;"* (----------------------------)"
700  STOP
1000  LET O=S(IN)
1010  LET D=Y(IN)
1020  LET NB=N(IN)
1030  IF NB>1 THEN GOTO 1070
1040  GOSUB 2000
1050  LET IN=IN-1
1060  RETURN
1070  LET S(IN+1)=S(IN)
1080  LET Y(IN+1)=6-Y(IN)-S(IN)
1090  LET N(IN+1)=N(IN)-1
1100  LET IN=IN+1
1110  GOSUB 1000
1120  LET O=S(IN)
1130  LET D=Y(IN)
1140  GOSUB 2000
1150  LET S(IN+1)=6-O-D
1160  LET Y(IN+1)=D
1170  LET IN=IN+1
1180  GOSUB 1000
1190  LET IN=IN-1
1200  RETURN
2000  LET MD=K(O,T(O))
2010  IF T(D)<1 THEN GOTO 2030
2020  IF MD>K(D,T(D)) THEN RETURN
2030  LET T(O)=T(O)-1
2040  LET T(D)=T(D)+1
2050  LET K(D,T(D))=MD
2060  PRINT AT 19-T(O),P(O);D$(10)
2070  PRINT AT 20-T(D),P(D);D$(MD)
2080  LET M=M+1
2090  PRINT AT 0,0;"MOVES:";M
2100  RETURN
```

MURDER ON THE ZINDERNEUF

HARDWARE REQUIREMENTS: *Atari 400/800/1200XL, 32K (disk); Commodore 64 (disk); joystick required.*
MANUFACTURER: *Electronic Arts, 2755 Campus Dr., San Mateo, CA 94403; (415) 571-7171*
PRICE: *$40*





Murder on the Zinderneuf is all the classic board game Clue is . . . and then some.

Set on a zeppelin crossing the Atlantic in 1936, this animated role-playing game puts you in the shoes of a detective caught in the middle of a murder mystery, with 15 suspects and a 36-minute time limit.

The screen then presents you with a cutaway view (from above) of the zeppelin's living quarters. It's then up to you to guide your detective through the hallways, searching rooms and encountering suspects.

In your search for clues, you'll see other passengers walking the halls and going in and out of rooms. When you bump into a suspect, you're presented with a menu including QUESTION, IGNORE, and ACCUSE SUSPECT. By moving the joystick and pressing the fire button, you indicate your choice.

If you choose to question, you're shown another menu, from which you select a method—from TOUGH and BRUTAL, to CONFUSED and SHY. To get the most out of questioning a suspect, gear the manner of your interrogation to suit their character.

Clues also can be discovered by searching rooms. You just guide your detective around a room until the screen tells you that you've found a clue or are wasting your time.

As the plot thickens and time starts to run out, you have to make a final decision: You can accuse a suspect before the *Zinderneuf* lands, make one final guess after you land, or press "Q" (for quitters) to end the game and reveal the murderer.

Murder on the Zinderneuf has no complicated directions. It's easy to play because all movements are controlled by the joystick and fire button. A player who likes games with quick arcade action, though, may get bored searching rooms.

The game's graphics are well done (like the scrolling of the ship), but aren't elaborate. The most creativity went into the animation of the characters: tiny musclemen, actresses, and dapper men with hats and canes.

If you're a mystery buff, you'll definitely enjoy *Murder on the Zinderneuf*. There are many variables that make it exciting and unpredictable. And don't worry—when you finish your first game, you're not done with it for good. Every passenger is a potential victim as well as possible murderer, and different characters and situations can be combined to produce a wide variety of suspenseful mysteries.

STEVE HOROWITZ, *16*
Westport, Connecticut.

THE RATINGS

K-POWER reviewers base their ratings on a 1–10 scale, with a 10 being that rare piece of software that's too outstanding for words. The lower end of the scale is reserved for the dogs that shouldn't have left the assembly line. Enough said.

ENCHANTER

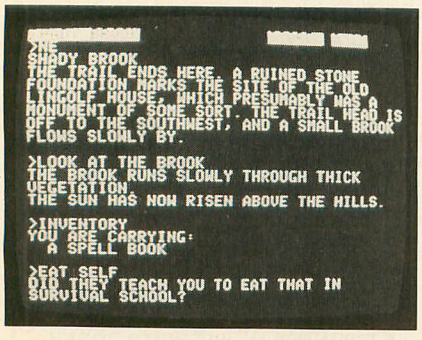
HARDWARE REQUIREMENTS: *Apple II/II plus/IIe, 32K (disk); also available for Atari 400/800/1200XL, 32K (disk); Commodore 64 (disk); IBM PC, 48K (disk); TRS-80 Models I/III, 32K (disk)*
MANUFACTURER: *Infocom, 55 Wheeler St., Cambridge, MA 02138; (617) 492-1031*
PRICE: *$49.95*

8

Enchanter, an adventure game set in a world of wizards and warlocks, is one of Infocom's latest masterpieces. With only four spells to your name, you (a lowly novice enchanter) must seek out and defeat the warlock Krill, an omnipotent outcast from the Circle of Enchanters.

When the game begins, your only possession is a spell book. But as you move deeper into the world of *Enchanter,* you acquire other items that help you on your quest.

One of the greatest features of the game is its realism. (I'm not talking about Krill and all the other magical beings, of course.)



There are a lot of little factors that add up and make *Enchanter* more like a real experience: time passes (there is night and day); you can interact with other characters; and during the course of the game, you have to eat, drink, and sleep. When you sleep, you even dream. (Dreams usually give hints on how to complete certain parts of the game.)

Enchanter's graphics are better than those generated by any computer, because they are pictures drawn by the imagination. Though the game is entirely in text, every situation is presented in great detail. You type in full-sentence commands. Many commands even have a variety of responses. Like most Infocom games, *Enchanter* has a vocabulary of more than 600 words. No more two-word adventures where half the game consists of finding out what words can be used.

This adventure is one of the best I've played. It's great for anyone who likes to sit down and become someone else. One warning, though: Don't bother with it if you're impatient. It could take days or weeks to solve.

JUSTIN GREENE, *16*
New York, New York

REPTON

HARDWARE REQUIREMENTS: *Commodore 64 (disk); also available for Atari 800/1200XL, 48K (disk); Apple II/II plus/IIe, 48K (disk); VIC-20 (cartridge); joystick optional*
MANUFACTURER: *Sirius Software, Inc., 10364 Rockingham Dr., Sacramento, CA 95827; (916) 366-1195*
PRICE: *$34.95*

7

You have been chosen by the Reptonian government to defend its space colony from enemy invasion. With your well-armed Star Fighter you must defeat the evil Quarriors and destroy their underground tower, which is essential to their persistent attacks on Repton. If you fail, well, let's just say the Reptonian government won't have to demote you.



Naturally, you'll need some high-tech weaponry to use against such foes, so the Sirius company has supplied you with five ships to help you do your dirty work. Your ship's primary weapon is a nose cannon with an endless supply of shells.

Also on board are nuke bombs that will eliminate all the unfriendlies in sight, but they're in short supply; you only have five of them at the start of the game. Every 5,000 points, however, you're awarded an extra life and nuke bomb. For defense, your ship is equipped with the "latest in shield technology." This means that when you let go of the joystick and fire button, your ship becomes virtually invisible and indestructible.

The Quarriors attack in waves, each more difficult than the last. Meanwhile, the Quarriors' allies, the Draynes, are helping in the construction of their base by stealing energy from one of the colony's power centers. Once the base is finished, you're forced underground and must get to and destroy the

Quarriors' tower, which is surrounded by mines.

The underground base is enclosed by stalactites at the top of the screen and rocks and buildings at the bottom. Missiles are fired at you from below and Single Saucers attack from above. The whole pace of the game is slowed down while underground, and your shields and radar are rendered inoperative.

In order to destroy the tower, you must fire five shots through the band near the top. If this is accomplished, the attack is cut off and Repton is brought out of danger.

Repton is a good, addictive game by Sirius Software, and is better than most other *Defender* look-alikes. The graphics are good, though simple, the animation is smooth, and the action is fast and furious.

TOM SABERHAGEN, *11*
ERIC SABERHAGEN, *13*
Albuquerque, NM.

MURDER BY THE DOZEN

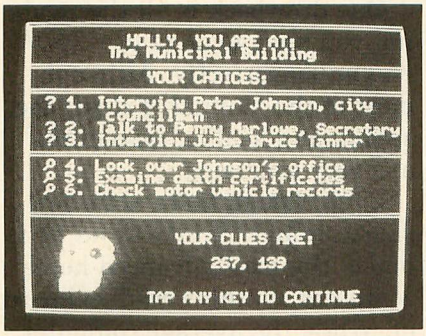
HARDWARE REQUIREMENTS: *Apple II plus/IIe, 48K (disk); Commodore 64 (disk); IBM PC (disk)*
MANUFACTURER: *CBS Software, 1 Fawcett Place, Greenwich, CT 06836; (203) 622-2503*
PRICE: *$34.95*

8

Wally Snark, a suspected drug dealer, has been murdered. As the top homicide detective on the Micropolis police force, it's up to you to find out who killed him, and why.

This is one of the 12 murder cases you'll have to solve in the mystery game *Murder by the Dozen*. When the game begins, you choose which case you want to work on. There's an interesting variety. Deaths range from shootings to a bedpan bludgeoning.

The game is unique. It's sort of like a multiple-choice adventure game. You play alone or with a friend, both racing to solve the puzzle. Starting with a case history and description of the evidence found, you have to question people and search the town for clues. You get to the bottom of it all by looking up clues in a book. The more clues you get, the better chance you stand of solving the case. But if you take too much time and/or ask too many questions, you'll get a low rating at the end of play. Ratings range from "World Class Detective" to "Rotten Detective."



Murder by the Dozen is great, especially for mystery fans. The tough plots will take some time to crack, so the game's good for many hours of play. The game forces you to think logically and deductively. I've played other mystery-type games, and *Murder by the Dozen* is one of the best.

ANNE MORRIS, *15*
Ann Arbor, Michigan

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SYNTHESOUND 64

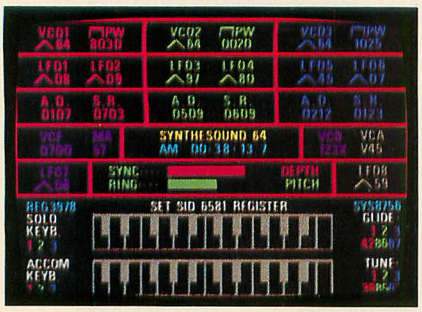
HARDWARE REQUIREMENTS: *Commodore 64 (disk); also available for Commodore VIC-20, 4K (cartridge)*
MANUFACTURER: *HesWare, 150 North Hill Dr., Brisbane, CA 94005; (415) 468-4111*
PRICE: *$34.95 (C 64); $29.95 (VIC-20)*



Synthesound 64, the new music synthesizer from HesWare, is definitely a step forward in home audio entertainment. By tapping into the 64's amazing SID 6581 music chip, *Synthesound 64* lets you create a wide range of sounds and perform music, all on your computer's keyboard.

Inside the package you might expect to find all sorts of intricate hardware. Instead, there's a single disk and a manual (a little thinner than a paperback) with instructions clear enough for the beginner, yet technical enough for the more advanced programmer.

Seconds after booting the disk, a control board similar to what an audio technician might use appears on the screen. Each of the three available voices is represented on the screen by a different-colored box. Within these boxes are a variety of options (covering pitch, attack, decay, waveforms, and many others) that you can change to get sounds ranging from a chugging train to a cathedral organ. The screen also shows two piano keyboards that correspond to keys on the computer, so you can play your computer just like a synthesizer once you've set the options.



One drawback is all the reading you have to do to use *Synthesound 64* correctly. Although most of the manual is clear, the saving and loading procedures are very confusing.

Even though there are a few shortcomings, *Synthesound 64* is one of the most advanced home computer synthesizers I've heard of. While the average computer user might get several hours of enjoyment from this program, only the serious composer or musician will be able to tap its full potential.

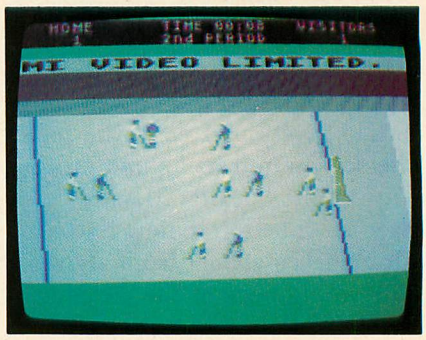
JOHN SKOOG, *15*
Parkland, Indiana

MAJOR LEAGUE HOCKEY

HARDWARE REQUIREMENTS: *Atari 400/800/1200XL, 16K (cartridge); joysticks required*
MANUFACTURER: *Thorn EMI, 1370 Ave. of the Americas, New York, N Y 10019; (212) 977-8990*
PRICE: *$39.95*



We're hockey nuts. We watch games whenever we can. So when we saw that *Major League Hockey*'s screen scrolled left and



right like the view you get when watching a game on TV, we thought it was a neat idea. It's almost like plugging your joystick into a real game on the tube.

Though *Major League Hockey* doesn't have a "fight" option, it's still a pretty good reproduction of one of the fastest games in sports. Even many of the rules, like "offsides," are programmed in, which adds a lot to the realism. The ability to check is included, too. Even the skater you hit falls down.

Each of the skaters is controlled with a joystick. The skaters nearest the puck turn briefly into numbers to indicate which joysticks are ready to control them. Once a player gains control, he can maneuver around the ice, check, skate with the puck, pass, or shoot.

Up to four can play at a time, which can provide for some pretty fierce games. Or, if you want, you can play the computer on one of four skill levels. Either way, the game's a real challenge. It'll take a bit of practice before you can master pin-point passes or get solid control of the goalie, but it's worth it. The game inspires real competition, and the graphics and sound are first-rate.

MARK SCIRE, *17*
PAUL SCIRE, *11*
Melville, New York

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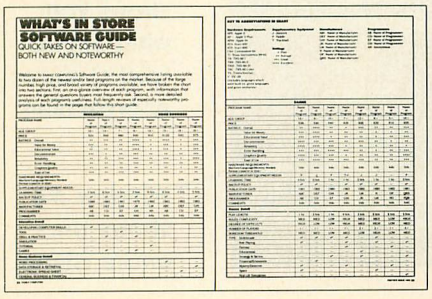
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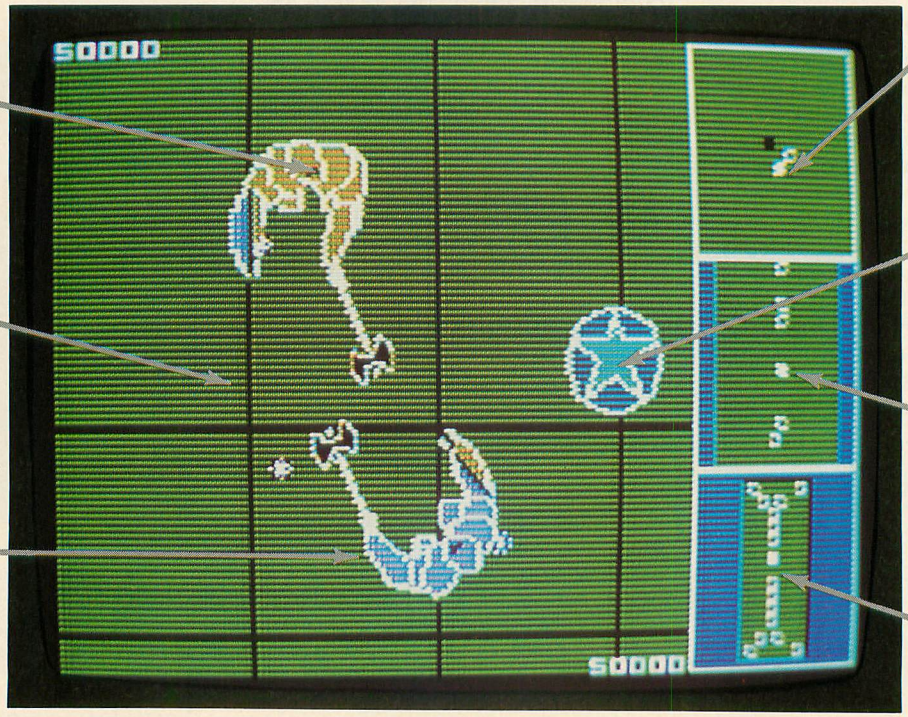
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AAARRGGH! IT'S *THE BILESTOAD!*

It's the 25th century and gladiator combat is making a comeback. This time with blood-spurting robots.

By Adam Campagna



The people of the 25th century have reached the breaking point. They're poverty-stricken, angry, and frustrated. The ruling computers (yes, they *will* have taken over by then) see a revolution brewing, so they decide to conjure up a form of therapeutic entertainment—something that lets the populace relieve their pent-up frustrations. They call their creation *The Bilestoad.*

That's how the folks at Datamost describe their latest game of axe-to-axe combat. It isn't recommended for the squeamish.

Here's how it works: Two players control axe-wielding robots on a small island arena (if you play alone, the computer becomes your opponent). It's the classic hunter-versus-hunted scenario.

THE CHARACTERS: WHEN MEATLINGS MEET

At the beginning of the game, players register their robots (meatlings) by entering their rank.

Your rank advances each time you win a game. The new rank is used next time you play.

Rank determines your role in each encounter. The lower-ranked player is always the Forsher—the prey. The Forsher avoids combat and tries to find the Zonenstrall, a small, circular symbol on the ground that teleports him to the next island. The higher-ranked player, the Yayger, must overtake and kill the Forsher. When you play the computer, you automatically become the Forsher, regardless of your rank.

The joystick fire button plus a cluster of nine keys control the meatlings (which are viewed from above). Keys determine the clockwise and counter-clockwise movement of the right arm (holding the shield), the left arm (holding the axe), and the body as a whole. Pressing the fire button makes the robot walk, and releasing it makes the robot stop.

SCORING: HITS AND HACKS

Both meatlings start with 50,000 points. Losing those points is pretty gruesome. When a meatling takes a hit, for example, it loses 70 points. When it loses a limb, 430 points are subtracted. Meatlings "die" when they suffer a certain number of blows or are decapitated. It's not a pretty sight.

Points are awarded for achieving what are called minor or major objectives. Major objectives are worth 5,570 points, and minor objectives are worth 1,130. (The Forsher scores a minor objective when he kills the Yayger instead of escaping on the Zonenstrall. The Yayger scores a minor objective when he steps on the Zonenstrall instead of killing the Forsher.) Each round ends after an objective is scored, and the game ends after five rounds. The player with the most points at the end of the game wins and is promoted to a higher rank.

SHYBEN: WATCH YOUR STEP!

Shyben are the most strategically important element of the game. They're symbols with various functions placed at different points on each island. When a meatling steps on one, here's what happens:



Zonenstrall—When a Forsher steps here, he achieves a major objective. A minor objective is scored when a Yayger steps on one.



Mondstrall—Setting foot on one of these is an automatic forfeit and will award an opponent a major objective.



Springers—These will teleport a meatling to another Springer of the same color elsewhere on the island.

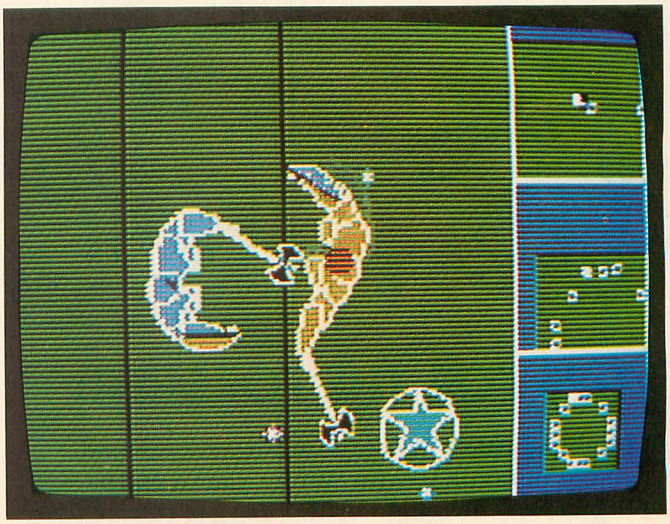


Loyfers—These floating platforms carry a meatling around the island at a pace quicker than walking. They're steered with the body controls.

THE COMBAT ARENA: THE ISLANDS

The screen shows four overhead views (called windows) of the island. The largest section of the screen shows the closest and most detailed view of the meatlings. The meatlings both appear on this screen until they wander away from each other. Then the computer switches the view from one robot to the other every few seconds. This lets both players do things at the same time, but it's hard to control your meatling when it's not on the screen.

There are three other overhead windows of the island, each one fourth the scale of the previous one. The last view is an overhead map of the entire island. The four views appear on the screen at the same time. You should scan all of them to find specific Shyben.



One of the exciting things about *The Bilestoad* is that every round is played on a different island. The higher you're promoted, the more new islands you'll encounter. There are more than 40 islands stored in the game. After you conquer the fortieth, the computer will begin to randomly generate new islands.

The Bilestoad is very flexible. You can play the game, settle a grudge in mortal combat, or invent your own contest of skill.

ADAM CAMPAGNA *is 17 and lives in New York City, where he attends The Calhoun School. His interests include science, soccer, and games of all kinds. He's been playing war games since he was nine.*

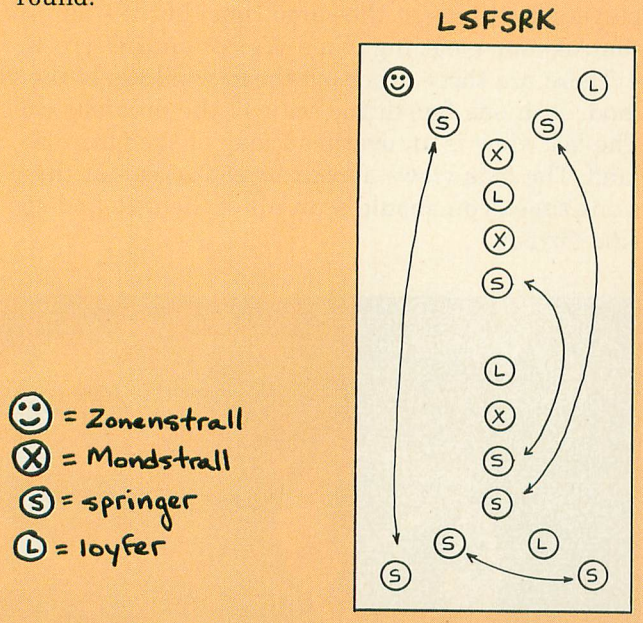
BEAT THE BILESTOAD

Here are a few pointers that will help you get through the game without losing too much blood.

MAPPING:

Make maps of every island you encounter.

If you've mapped an island you're about to do battle on, study it carefully before beginning the round.



TIPS FOR THE FORSHER:

Find and ride a Loyfer to scout every island you're unfamiliar with. While you're on the Loyfer, it'll be tough for the Yayger to catch you.

If you've never seen an island before, search the corners for the Zonenstrall first. They're usually placed somewhere remote.

Map the easiest route to the Zonenstrall so you'll have a record of it for the next time you're on the island.

TIPS FOR THE YAYGER:

Get on the nearest Loyfer as soon as possible. You'll then be able to catch up with the Forsher and eliminate him.

Both meatlings move at the same speed, so don't bother trying to catch the Forsher in a foot race.

If the Zonenstrall is closer to you than it is to your opponent, go straight to it and wait for him to come to you.

In combat, try to grapple your opponent and swing your axe around behind his back. You'll have him trapped, and he'll be forced to escape across the path of your weapon.

BEATING THE COMPUTER ROBOT:

The robot will always go to the same Loyfer on a given island. If you beat him to it, you'll be buying yourself some extra time.

With practice, you can lure the robot into stepping on the Mondstrall and killing himself.—A.C.



Photo: Curtis Washington

Timex-cellent

Timex's latest contender in the home computer market seems well qualified to give the competition a few good rounds. It is easy to operate, has a great deal of user-available memory, and a dynamite price to boot.

The Timex Sinclair 2068 is turning heads with its $199 price tag. It comes with 48K RAM and 24K ROM. The TS computer (like the 1000) has one-key command entry; for example, instead of typing PRINT, you just hit the "P" key. A syntax editor points out errors every time you enter an incorrect line in BASIC. The TS computer has a special mode that lets you type 64 letters onto one line.

The computer's sound and graphics ability are amazing for the price, too. There's a built-in speaker, three sound channels, and a fourth "beep" channel. These channels can be programmed separately for both tone and noise. An adjustment of monitor brightness can turn eight colors into 16.

Forty programs are currently available for the Timex Sinclair, mostly in cassette. The company is in the process of developing cartridges for the Timex 2000 series. It promises home-management, graphics, educational, and game software, all priced between $29 and $60. An adventure game based on *The Hobbit* and favorites like Scrabble have already been developed by Timex. At press time, no software companies were making TS versions of their programs.

The Timex Sinclair 2068 is good-looking at a fair price. Peripherals such as a $99 thermal printer, $120 modem, and $50 tape recorder are available or are promised to be ready soon. The Timex Sinclair 2068 can be purchased at computer stores or by contacting Timex Computer Corp., P.O. Box 2655, Waterbury, CT 06725; (800) 248-4639.

Timex Sinclair 2068

MEMORY:
48K RAM, nonexpandable
24K ROM
38.5K user-available memory in BASIC

TEXT DISPLAY:
32 × 24 lines standard
64 × 24 alternate mode

GRAPHICS:
8-color
256 × 192 normal resolution
512 × 192 alternate mode

SOUND:
3 voices, 10 octaves,
1 "beep" channel,
built-in speaker

KEYBOARD:
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PROGRAMS:
40 available from $29 to $60

SPECIAL FEATURES:
One-key command entry
Syntax editor

K-POWER

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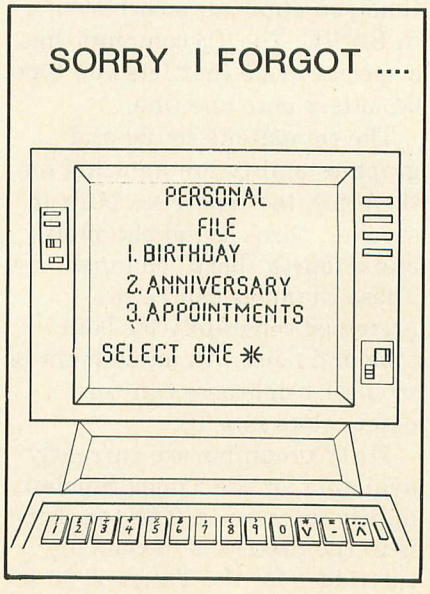
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Agent U.S.A., Spelldiver, Bannercatch designed and developed by Tom Snyder Productions, Inc. Story Tree designed and developed by George Brackett. • Agent U.S.A., Spelldiver, Bannercatch available for Atari 800/1200/XL. Commodore, Apple, IBM versions available soon. • Story Tree available for Apple.

CONTEST

SECRET ENCODER/DECODER

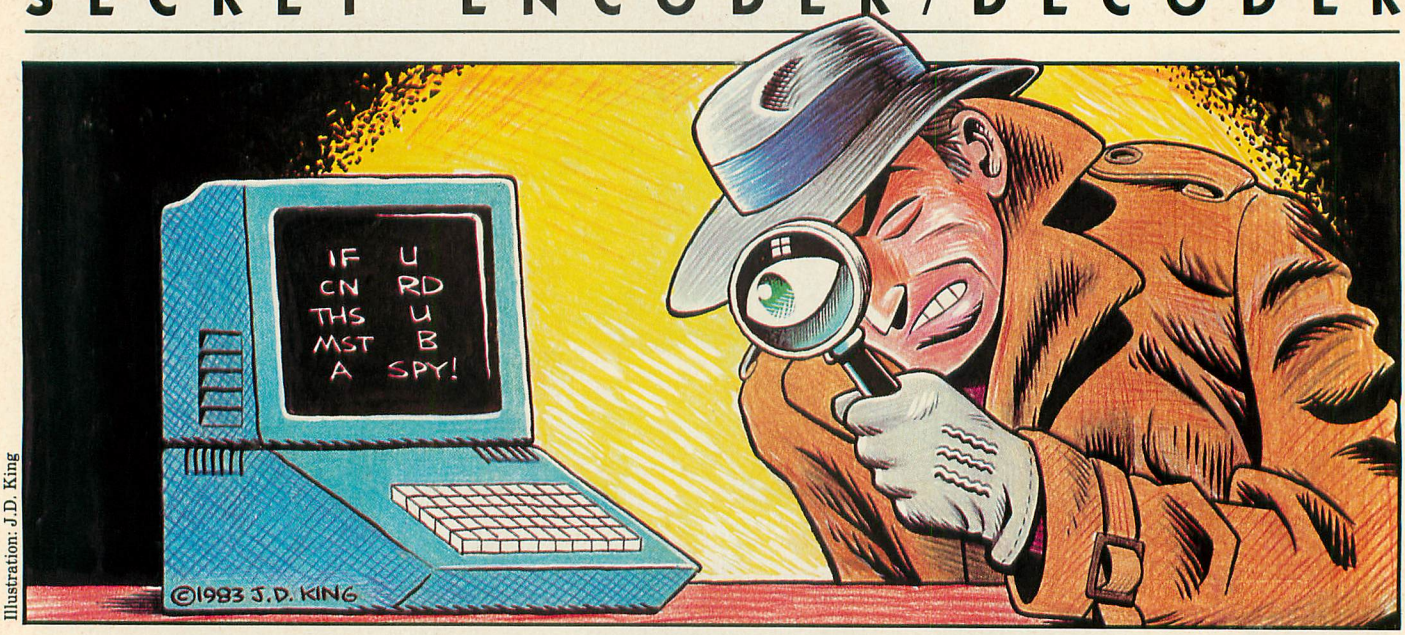


Illustration: J.D. King

How slick a programmer are you? Can you devise a program that can make and break a secret code in ten 80-character lines or less? Can it translate anything you type in into a secret language? Can you then use the program to decode the secret language and translate it back into English? Can you?

Well, then do it! K-POWER wants to see it. You have to follow these guidelines to win:

- Write the program in BASIC.
- Combine the encoder/decoder into one program.
- Include a menu that lets the user decide which one to use at any given time.
- Make sure that the entire program is ten 80-character lines, or less.

All entries will be judged on their efficiency, creativity, and originality. The best program wins a K-POWER T-shirt and a free one-year subscription. Five runners-up also will receive K-POWER T-shirts. All the winning entries will be printed in a future issue of K-POWER.

To enter, mail us a printout (or reasonable facsimile) of your program with the questionnaire below (filled in, of course). All entries must be received no later than April 27, 1984.

ENCODER/DECODER CONTEST
K-POWER, 730 Broadway,
New York, NY 10003

ENCODER/DECODER CONTEST

1. My secret code program:

_____

_____

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_____

_____

_____

_____

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(Attach a printout if you don't want to fill in the above)

2. Tell us about K-POWER

a) Best section: _____

b) Favorite article: _____

c) Favorite program: _____

d) What else do you want to read about? _____

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e) Are you a subscriber? yes _____ no _____

3. Do you program? _____ How long have you been programming? _____

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4. What kinds of things do you like to program?

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Name _____

Address _____

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State _____ Zip _____

Telephone number _____

T-shirt size: S M L XL (circle one)



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